Semi-Annual Status Report No. 23

Olin Chemical Superfund Site
51 Eames Street, Wilmington MA
6107180016

Prepared for:

Olin Corporation
3855 North Ocoee Street, Suite 200, Cleveland TN 37312

3-Jan-19

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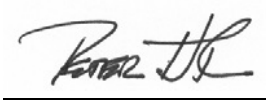

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List of acronyms

AMEC	AMEC Environment & Infrastructure, Inc.
BEHP	Bis(2-ethylhexyl)phthalate
CSL	Calcium Sulfate Landfill
DAPL	Dense Aqueous Phase Liquid
DMF	Dimethylformamide
EE/CA	Engineering Evaluation/Cost Analysis
EPH	Extractable Petroleum Hydrocarbons
IRS	Interim Response Steps
IRSWP	Interim Response Steps Work Plan
ISCO	In-situ Chemical Oxidation
LNAPL	Light Non-aqueous Phase Liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
MassDEP	Massachusetts Department of Environmental Protection

MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSA	Method of Standard Additions
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter
NDMA	N-nitrosodimethylamine
NDPhA	N-nitrosodiphenylamine
NDPrA	N-nitroso di-n-propylamine
Olin	Olin Corporation
off-PWD	off-Property West Ditch
OU	Operable Unit
QA/QC	Quality Assurance/Quality Control
RAE	Remedial Alternatives Evaluation
RGP	Remediation General Permit
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RPD	Relative Percent Difference
SASR	Semi-Annual Status Report
Site	Olin Chemical Superfund Site
SVOC	Semi-Volatile Organic Compound
TAL	TestAmerica Laboratories, Inc.
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
VPH	Volatile Petroleum Hydrocarbon
Wood	Wood Environment & Infrastructure Solutions, Inc.

1.0 INTRODUCTION

This Semi-Annual Status Report (SASR) has been prepared for the Olin Chemical Superfund Site (the Site) in Wilmington, Massachusetts, on behalf of Olin Corporation (Olin) by Wood Environment & Infrastructure Solutions, Inc. (Wood, formerly Amec Foster Wheeler). The SASR has been prepared consistent with Section 2.II.C. of the Statement of Work, Remedial Investigation/Feasibility Study (RI/FS), Olin Chemical Superfund Site, prepared by the United States Environmental Protection Agency (USEPA) Region I – New England and dated June 2007 (USEPA, 2007). This SASR summarizes the monitoring activities conducted from April 2018 through September 2018 and presents monitoring data and analytical results including, but not limited to, groundwater and surface water data from the Slurry Wall/Cap and Plant B monitoring programs for the second and third quarter of 2018.

The Site location is presented in **Figure 1-1**. **Figure 1-2** is a Site plan that identifies the three areas that are described in the Interim Response Steps Work Plan (IRSWP) including Slurry Wall/Cap Containment Area, Plant B, and the off-Property West Ditch (OPWD) area. This SASR discusses field and report-related activities for those three areas which are ongoing Interim Response Steps (IRS) as described in the IRSWP and the DAPL Extraction Study status.

The three specific IRSs include:

- Slurry Wall/Cap – monitoring of groundwater, surface water, and sediment in the area surrounding the Slurry Wall and inspection of the temporary cap;
- Plant B – operation, maintenance, and monitoring of the groundwater recovery/treatment system that was designed to remove and control migration of light non-aqueous phase liquid (LNAPL); and
- Dense Aqueous Phase Liquid (DAPL) Extraction – Design, installation and operation of a pilot study to evaluate the efficacy of DAPL extraction in the OPWD Area.

This SASR is organized as follows:

Section 1.0 – Introduction

Section 2.0 – Slurry Wall/Cap

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E-2 Groundwater Elevation (Corrected for Barometric Pressure) and Precipitation – Third Quarter 2018

2.0 SLURRY WALL/CAP

The following sections present results of chemical analyses for groundwater and surface water samples associated with the slurry wall/cap during the second and third quarter of 2018. Groundwater level data for the second and third quarter of 2018 are presented in the field activity reports contained in **Appendices A-1 and A-2**. The data validation memoranda for these sampling events are provided in **Appendices B-1 and B-2**, respectively. The results of these analyses are generally consistent with past results.

Olin personnel conducted weekly observations of the weir and South Ditch and recorded observations concerning wildlife, surface water conditions, and flocculent accumulation. These reports are reviewed by Wood and compiled in separate monthly reports, which are provided for the current reporting period in **Appendix C**.

2.1 Groundwater

Groundwater sampling and analysis for the second quarter of 2018 sampling event was completed from May 15 through 18, 2018. The third quarter of 2018 sampling event was completed from August 6 through 7, 2018.

The second quarter of 2018 sampling event included groundwater sample collection from 15 monitoring wells: GW-10S, GW-24, GW-25, GW-34SR, GW-34D, GW-35S, MP-2#13, GW-43SR, GW-76S, GW-78S, GW-79S, GW-201S, GW-202S, GW-202D, and GW-CA-1; and five piezometers: PZ-16RRR, PZ-17RRR, PZ-18R, PZ-24, and PZ-25 located along the South Ditch consistent with the Final IRSWP. The third quarter of 2018 sampling event included groundwater sample collection from five monitoring wells: GW-25, GW-78S, GW-79S, GW-202S, and GW-202D; and five piezometers: PZ-16RRR, PZ-17RRR, PZ-18R, PZ-24, and PZ-25.

Quality Assurance/Quality Control (QA/QC) samples include two field duplicates and matrix spike/matrix spike duplicates (MS/MSD).

The sample locations, details of sampling, and the analytical program are identified in the field activity reports. Field activity reports for the second and third quarter of 2018 sampling events are contained in **Appendices A-1 and A-2**, respectively. The field activity reports also contain tabulated final field parameter measurements collected at the time of sampling, sample collection field data records, and instrument calibration records. Groundwater samples were analyzed by TestAmerica Laboratories, Inc. (TAL) for ammonia, chloride, sulfate, specific conductance and filtered samples are analyzed for aluminum and chromium.

Table 2-1 and Table 2-2 summarize groundwater analytical results for samples collected during the second and third quarter of 2018 sampling events. The data validation memoranda for groundwater and surface water are included in **Appendices B-1 and B-2** and conclude that TAL results are useable as reported by the laboratory unless otherwise indicated in the validation report.

Appendix D-1 presents time series groundwater concentration plots for aluminum, ammonia, chloride, chromium, specific conductance, and sulfate from the south, southeast, west, and north areas surrounding the Containment Area. These plots include historic data along with data from the second and third quarter of 2018 sampling events. Groundwater analytical data for monitoring well GW-43SR (west of the Containment Area) was added to **Appendix D** when it was replaced in November 2010, and piezometers PZ-24 and PZ-25 were added in June of 2011 at the request of USEPA. Piezometer (PZ-24) and well (GW-35S) identified on these plots are interior to the Containment Area, while one well (GW-CA1) is located within the gravel equalization window of the Containment Area.

The analytical results for dissolved metals (aluminum and chromium) in groundwater samples collected from south of the Containment Area (GW-78S, GW-202S, GW-202D, PZ-17RRR, PZ-18R, PZ-24, PZ-25), southeast of the Containment Area (GW-79S, GW-201S, PZ-16RRR), west of the Containment Area (GW-24, GW-25, GW-26, GW-42S (MP-2#13), GW-43SR, GW-76S), and north of the Containment Area (GW-10S, GW-34D, GW-34SR, GW-35S, GW-CA1) are consistent with historical data and the previous reporting period and are stable within historical ranges (**Appendix D-1, Figures D-1.1 through D-1.8**).

Concentrations of dissolved aluminum and chromium in GW-202D (filtered samples) have declined from the maximum concentrations detected in 2008 and 2009 and have continued to decline (Al) or remained stable (Cr) over the past several years.

The analytical results for ammonia in groundwater samples are consistent with historical data and are stable within historical ranges (**Figures D-1.9 through D-1.12**).

Concentrations of ammonia in groundwater samples from locations GW-202D, PZ-16RRR, GW-79S, and PZ-18R have declined from the maximum concentrations detected in 2008 and 2009 and have been comparatively stable for the last several years. Concentrations detected in PZ-18R continue to fluctuate over a wider range with the highest concentrations occurring in spring (March-May) and lowest levels occurring in the fall (November) **Figure D-1.9 and D-1.10**. PZ-18R ammonia concentrations are higher than those found in groundwater (GW-202D and GW-202S) or in downstream pore water underlying South Ditch (PZ-17RRR).

Concentrations of sulfate and specific conductivity are generally consistent with historical data and are stable within historical ranges (**Figures D-1.17 through D-1.24**). Specific conductivity and sulfate concentrations are consistent in PZ-18R and GW-202D and continue to show largest seasonal fluctuations and are similar to the results for ammonia.

Concentrations of chloride south of the Containment Area at GW-202S exhibits a small but gradual increase since 2012 (**Figure D-1.13)** reflecting upgradient sources described below.

Concentrations of chloride and specific conductivity located west and up gradient of the Containment Area have increased since 2010 at locations GW-24, GW-25, MP-2#13 (GW-42S), and GW-43SR (**Figure D-1.15 and D-1.23**) and are interpreted to reflect industrial development activities and increased use of de-icing salts on adjacent properties since other sample parameter concentration (aluminum, ammonia, chromium, sulfate) have not increased over that same period. Chloride and specific conductivity concentrations detected at location GW-76S have decreased since highs in 2013 (**Figure D-1.15 and D-1.23**). The highest concentrations of chloride in PZ-18R are seasonal and occur in the spring (March-May) with the lowest levels occurring in the fall (November). Shallow groundwater on the south side of the Containment Area (GW-202S) has shown a similar pattern of increasing chloride concentrations during this same time frame.

Groundwater levels were measured from select groundwater monitoring wells and piezometers prior to each sampling event. Water level measurements are tabulated in **Appendices A-1 and A-2**. These measurements and the interpreted groundwater potentiometric surfaces are depicted on **Figures 2-1 and 2-2**. The water levels and interpreted groundwater potentiometric surface for the second and third quarter of 2018 are consistent with prior periods.

2.2 Surface Water

The second quarter of 2018 Surry Wall/Cap sampling event include the collection of surface water samples from seven locations ISCO-1, ISCO-2, ISCO-3, PZ-16RRR, PZ-17RRR, PZ-18R, and SD-17. Unfiltered samples were analyzed by TAL for aluminum, chromium, sodium, ammonia, chloride, nitrate, nitrite, sulfate, and specific conductance. In addition, filtered surface water samples were analyzed for metals: aluminum, chromium, and sodium. QA/QC samples include one field duplicate and one MS/MSD. The sample

locations, details of sampling, and the analytical program are identified in the field activity report in **Appendix A-1**. During the third quarter 2018 sampling event, the South Ditch and East Ditch were observed to be dry and therefore no surface water samples were collected.

Table 2-3 summarizes surface water analytical results for samples collected during the second quarter 2018 sampling event. The surface water data validation memorandum is included in **Appendix B** and concludes that TAL's results are useable as reported by the laboratory unless otherwise indicated in the validation report.

Appendix D-2 presents time series surface water concentration plots for dissolved aluminum, dissolved chromium, ammonia, chloride, sulfate, and specific conductivity from the Upper South Ditch and Lower South Ditch areas. These plots include historic data along with data from the second quarter of 2018 sampling event.

Detected concentrations and temporal patterns of the metals and inorganic parameters are consistent and within historical ranges from samples collected in the Upper South Ditch and Lower South Ditch. Dissolved aluminum and dissolved chromium in surface water from the Upper South Ditch and Lower South Ditch have decreased and stabilized since 2008 at sample location PZ-16RRR and since 2013 at sample locations SD-17 and ISCO-2 **(Figures D-2.1 through D-2.4)**. Ammonia, sulfate, and specific conductance concentrations in surface water samples have also decreased and stabilized since 2009 in the Upper South Ditch and Lower South Ditch and exhibit greater seasonality. (**Figures D-2.5 through D-2.12**). Concentrations in surface water above the weir (PZ-18RSW and ISCO-1) are lower and have remained more stable (lacking indications of seasonality) since the weir suppresses groundwater discharge upstream of the weir. Concentrations of chloride appear to have increased slightly since 2008 and 2009 in Upper South Ditch at locations ISCO-1 and PZ-18R and Lower South Ditch at location ISCO-3 consistent with trends in upgradient groundwater from increased use of de-icing road salt at commercial operations along adjacent properties and roadways (**Figures D-2.7 and D-2.8**).

2.3 Data Logger Data

Data loggers are deployed in 10 monitoring wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, GW-6S, PZ-24, and PZ-25, to continuously monitor groundwater elevation within and outside the Containment Area. **Appendix E** presents time series groundwater elevation plots (**Figure E-1 and Figure E-2**) compared to precipitation data measured at the Site. These plots include groundwater elevations from April 2018 through September 2018 and have been corrected for barometric pressure using Site specific barometric pressure data. The data acquisition rate remains one reading every hour.

Continuous water level data plots indicate groundwater within and outside of the Containment Area responds to recharge of the aquifer. There were not many recharge rain events in the second quarter and third quarter of 2018 which led to groundwater recession and elevation lows from April through July. Several significant rain events at the end of the third quarter 2018 led to seasonal water elevation highs in September 2018. Comparison of water levels in GW-35S and GW-CA1 indicates an outward flow gradient through the equalization window in April and May 2018; with an inward flow gradient from June through September 2018.

2.4 Temporary Cap Inspection

As detailed in SASR No. 18, the official temporary cap inspection frequency was reduced from quarterly to semi-annually. The semi-annual inspection for the second quarter of 2018 was conducted on April 20, 2018. The inspection field data record, which indicates observations, maintenance, and repairs completed on the

temporary cap, is included in Appendix C of the second quarter of 2018 field activity report (FAR) attached in **Appendix A**.

As stated previous SASRs, Olin is self-performing official inspections and integrating the inspection and maintenance repair activities. Olin continues to perform additional random inspections to ensure that any potential maintenance needs are addressed in a timely fashion.

3.0 PLANT B

The following sections present results of chemical analysis of groundwater for the second and third quarter of 2018 Plant B sampling events. Groundwater level data from these sampling events are presented in field activity reports contained in **Appendices A-1 and A-2**. The data validation memoranda for the second and third quarter of 2018 are provided in **Appendices B-1 and B-2,** respectively.

Olin personnel collected monthly water level, LNAPL thickness, LNAPL recovery data, and sampled the treatment plant influent and effluent in accordance with the Remediation General Permit (RGP) requirements. Samples are analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total metals, hexavalent chromium, chloroform, total phenols, residual chlorine, total suspended solids (TSS), chloride, and pH. The analytical program for the RGP was described in the IRSWP (MACTEC, 2008) and is subject to revision under a new permit. The analytical data for the RGP are retained on-Property by Olin in accordance with that permit. Plant B sampling frequencies continue on a monthly basis. Treated groundwater is stored in the newly installed on-Site Plant B aboveground storage tanks (ASTs) and sampling is completed prior to discharge. A summary table of Plant B influent and treated water data is presented in **Table 3-1**. The monthly water level and LNAPL thickness data (April 2018 – September 2018) are summarized in **Tables 3-4 and 3-5** and **Figures 3-1 through 3-12**.

On June 29, 2018, Olin notified USEPA of a temporary shutdown of Plant B to allow Olin to discuss with USEPA's RGP permit writer changes in the new permit. On August 3, 2018, Olin notified USEPA of its intent to conduct additional monitoring in accordance with the appropriate portions of the USEPA-approved pumping rate reduction test outlined in the Interim Response Steps Work Plan (dated July 25, 2007 and approved August 6, 2008). As a result, monthly pumping and discharge was placed on hold during the SASR reporting period.

East Ditch observations are made from the embankment on a daily basis during normal working days by the Olin staff that operates Plant B. The Plant B Water Treatment Plant Daily Report contains a check box for observation of LNAPL related sheens in the East Ditch. This check box is used if a sheen is observed. The daily report is an internal Plant B record of operating parameters for the treatment plant. Sheens in the East Ditch were not observed during the April 2018 through September 2018 monitoring period.

3.1 Groundwater

The second and third quarter of 2018 sampling events included groundwater sample collection from monitoring well GW-16R. Groundwater samples were collected and analyzed for trimethylpentenes, n-nitrosodiphenylamine (NDPhA), bis(2-ethylhexyl)phthalate (BEHP), volatile petroleum hydrocarbons (VPH), ammonia, iron, and pH.

The second quarter of 2018 and third quarter of 2018 sample locations, details of sampling, and the analytical program are described in the field activity reports (**Appendices A-1 and A-2**, respectively). **Tables 3-2 and 3-3** present analytical results from the second quarter of 2018 and third quarter of 2018 groundwater sampling events, respectively. Data validation memoranda for these sampling events are included in **Appendix B** and indicate the analytical results are useable as reported by the laboratory unless otherwise indicated in the validation report.

The second and third quarter of 2018 analytical results for trimethylpentenes, NDPhA, BEHP, VPH, ammonia, iron, and pH in groundwater remain consistent with past results.

Olin personnel measure groundwater levels from 25 monitoring wells and three groundwater extraction wells (IW-11, IW-12, and IW-13) on a monthly frequency. If the water level probe suggests the presence of LNAPL, the thickness of the LNAPL is measured. The monthly water table elevation data are presented in

Tables 3-4 and 3-5 and in **Figures 3-1 through 3-6** during the April 2018 through September 2018 reporting period.

3.2 Light Non-Aqueous Phase Liquid

The LNAPL layer in the vicinity of the Plant B treatment plant is extremely thin. A protocol for LNAPL thickness measurement and confirmation of LNAPL presence via visual observation was developed previously to address the interpretation of instrument response for what appears to be a very thin LNAPL layer at and below the meter sensitivity for detection (less than 0.01 feet). The LNAPL thickness measurement data for the reporting period are presented in **Figures 3-7 through 3-12**. LNAPL has been observed in both the observation wells and groundwater extractions wells. A layer of LNAPL has consistently been measured in wells: GW-23, IW-11, and P5 with thin layers of LNAPL observed in wells: 12-IN, PID, and IW-2.

The monthly LNAPL recovery data are presented in **Tables 3-4 and 3-5**. Over the reporting period, on average, approximately 0.28 gallons of LNAPL was recovered per month. The total LNAPL recovered for the April 2018 through September 2018 period was 1.68 gallons. Monthly and cumulative LNAPL recovery data are summarized in **Figure 3-13**. Groundwater levels relative to monthly LNAPL recovery are plotted and summarized in **Figure 3-14**.

The LNAPL recovery data indicate a stabilization of the LNAPL recovery rate since 2005 with all the recovered LNAPL coming from IW-11.

4.0 DAPL EXTRACTION

This section reports progress on the DAPL Pilot Study and summarizes communication between Olin and USEPA for the reporting period (April 2018 through September 2018).

4.1 Operations Status

During the reporting period the extraction system operated at an extraction rate of approximately 0.25 gpm and was online from April 2018 through May 2018. The system went offline on May 31, 2018 due to DAPL solution dilution at the extraction point. After it was determined that DAPL levels had recovered, the extraction system was restarted, and operations resumed on October 25, 2018.

4.2 Reporting Status

Periodic data plots for pH, and specific conductance from multilevel wells (ML-1, ML-2, MP-2), the extraction well (EW-1) and induction logging results (ILW-1, and ILW-2) are sent directly to USEPA by Olin on an as needed basis.

5.0 ADDITIONAL ACTIVITIES

During the reporting period for this SASR (second and third quarter 2018), Olin has completed or continued to progress on activities as described below. In addition, quarterly residential drinking water samples were collected from several residences in proximity of the Site.

Additional Remedial Investigation (RI) activities that were conducted are also described.

5.1 Major Submittals, Meetings and Other RI/FS Activities

The following submittals were made during the reporting period.

- A letter report titled "Results of Containment Area Bedrock Borings" was submitted to USEPA on May 10, 2018.
- SASR No. 22 was submitted to USEPA on June 26, 2018.
- On July 6, Olin submitted a Rock Matrix Sampling Work Plan for the Olin Chemical Superfund Site. This was a revision to an earlier draft submitted on April 26, 2018.
- A letter outlining Abandonment Steps/Procedures for Containment Area Borehole OC-BB-2-2018 was submitted to USEPA on August 23, 2018.
- Olin had correspondence with USEPA concerning Plant B RGP as discussed in Section 3.0.
- On September 25, 2018, Olin received USEPA comments on RI/FS submittals. Olin is currently responding to USEPA comments.

There were no additional major submittals specific to the OU3 RI/FS process during the reporting period.

5.2 Residential Drinking Water Sampling

The following paragraphs summarize water supply sampling activities at residential locations in accordance with methods in the approved RI/FS Work Plan, and as modified by the Summary Report for the 2010 Residential Drinking Water Program and the Phase I Private Well Sampling proposal.

Second quarter 2018 private well sampling was completed on June 12 and 13, 2018. Six residences: Map 2/Lot 7, Map 24/Lot 54, Map 24/Lot 63, Map 24/Lot 64, Map 24/Lot 94, and Map 27/Lot 14C were sampled and analyzed for the following parameters: SVOCs, N-nitrosodimethylamine (NDMA), N-nitroso di-n-propylamine (NDPrA), metals, hexavalent chromium, anions (chloride, sulfate, nitrate, nitrite), and ammonia. Two residences: Map 24/Lot 66, and Map 24/Lot 72 were sampled and analyzed for: NDMA, NDPrA, metals, anions, and ammonia. One residence: Map 14/Lot 2B was sampled and analyzed for: NDMA, NDPrA, metals, hexavalent chromium, anions, and ammonia. Seven residences: Map 3/Lot 7, Map 1/Lot 6D, Map 1/Lot 6C, Map 3/Lot 2F, Map 3/Lot 2, Map 3/Lot 2D and Map 24/Lot 116 were sampled and analyzed for NDMA only.

Samples were not collected from location Map 15/Lot 2C because the owners were away on an extended vacation and location Map 24/Lot 65 because the water was shut down.

Third quarter 2018 private well sampling was completed on September 27-28, 2018 at the same residences and for the same analysis as listed during the June 2018 event (above); with the following exceptions: Samples were collected at location Map 15/Lot 2C for SVOCs, NDMA, NDPrA, metals, hexavalent chromium, anions, and ammonia. No samples were collected from location Map 3/Lot 2F because the well was shut down and location Map 24/Lot 116 because no access was provided.

Data from the June and September 2018 residential drinking water sampling events are summarized in **Tables 5-1 and 5-2**, respectively. The validation memoranda for the private well sampling events are attached in **Appendix B**.

5.3 Plant B Pumping Rate Reduction Test

The proposed Pumping Rate Reduction test is still officially on hold; however, some related monitoring activities were conducted in conjunction with temporary suspension of Plant B operations as described in Section 3.0.

5.4 OU1 and OU2 Remedial Investigation Sampling and Analytical Results

No additional OU1 and OU2 sampling activities have been completed during this reporting period. The OU1/ OU2 Draft Final Remedial Investigation Report was submitted to EPA on July 24, 2015 and was approved by USEPA.

5.5 OU3 Remedial Investigation Groundwater Sampling and Analytical Results

Results from all OU3 groundwater instigation was summarized and provided to the USEPA as Draft OU3 Remedial Investigation Report dated March 30, 2018. Additional OU3 investigation activities were completed in March 2018. These activities included drilling two bedrock boreholes on the Olin property; one bedrock boring installed inside the cap and one bedrock boring installed outside the cap. The results of this investigation were summarized and provided to the USEPA under separate cover on May 10, 2018.

A full water level synoptic gauging event was completed in October 2018. Results from this event will be included in a revised RI report.

5.6 Calcium Sulfate Landfill

Groundwater sampling at the Calcium Sulfate Landfill (CSL) has been completed consistent with the Massachusetts Department of Environmental Protection (MassDEP) approved semi-annual monitoring schedule (May and November). Groundwater samples were collected from select monitoring wells identified in **Figure 5-1**. Samples were collected and submitted by Olin personnel for the following analysis: total dissolved solids (TDS), total metals (calcium, sodium, aluminum, manganese, iron, chromium, and nickel), chloride, sulfate, and alkalinity. The data validation memorandum for the CSL groundwater monitoring program is attached in **Appendix B**. The CSL data (2017-2018) will be summarized and submitted to MassDEP in the 2019 biennial report.

6.0 REFERENCES

AMEC Environnent & Infrastructure, Inc. (AMEC), 2012. Operations, Maintenance & Performance Monitoring Plan, DAPL Extraction Pilot Test for the Olin Chemical Superfund Site in Wilmington, MA, October 8, 2012.

MACTEC Engineering and Consulting, Inc. (MACTEC), 2008. *Final Interim Response Steps Work Plan*, *Olin Chemical Superfund Site, Wilmington, Massachusetts*. August 8, 2008.

Tables

Table 2-1
Slurry Wall/Cap Analytical Results for Second Quarter 2018 Groundwater Sampling
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-10S 5/18/2018	OC-GW-201S 5/18/2018	OC-GW-202D 5/15/2018	DUP GW 202D 5/15/2018	OC-GW-202S 5/15/2018	OC-GW-24 5/18/2018	OC-GW-25 5/16/2018	OC-GW-34D 5/17/2018	DUP GW 34D 5/17/2018	OC-GW-34SR 5/17/2018	OC-GW-35S 5/17/2018
Metals, Filtered (mg/L)											
Aluminum	3.6	0.1 J	0.89	0.93	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	0.0012 J	0.051	0.22	0.22	0.0027 J	0.005 U	0.005	0.0099	0.011	0.0019 J	0.011
Inorganics (mg/L)											
Nitrogen, as Ammonia	0.75	99	120	120	33	26	19	2.9 J	2.0 J	0.24 U	15
Chloride	11	50	170	170	150	74	290	3.8	3.8	1.9	3.7
Sulfate	44	1200	930	1100	150	24	46	20	20	8.5	340
Specific Conductance (mS/cm)	130	2500	2600	2600	1000	480	1200	110	120	64	1100

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Table 2-1
Slurry Wall/Cap Analytical Results for Second Quarter 2018 Groundwater Sampling
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-42S (MP2 PORT 13) 5/18/2018	OC-GW-43SR 5/18/2018	OC-GW-76S 5/18/2018	OC-GW-78S 5/16/2018	OC-GW-79S 5/16/2018	OC-GW-CA-1 5/17/2018	OC-PZ-16RRR 5/16/2018	OC-PZ-17RRR 5/16/2018	OC-GW-18R 5/16/2018	OC-PZ-24 5/15/2018	OC-PZ-25 5/15/2018
Metals, Filtered (mg/L)											
Aluminum	0.74	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	0.022	0.0015 J	0.0034 J	0.0025 J	0.0068	0.01	0.0065	0.0067	0.045	0.022	0.011
Inorganics (mg/L)											
Nitrogen, as Ammonia	39	0.97	7.9	30	46	0.81	83	36	190	34	34
Chloride	400	320	29	10	89	7.0	120	14	630	7.2	23
Sulfate	180	26	37	490	640	54	570	430	1700	840	550
Specific Conductance (mS/cm)	1600	1100	250	1500	1900	460	1700	1400	4900	1800	1500

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Prepared by: KMS 11/27/18
Checked by: CTM 11/30/18

Table 2-2
Slurry Wall/Cap Analytical Results for Third Quarter 2018 Groundwater Sampling
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-202D 8/6/2018	OC-GW-202S 8/6/2018	OC-GW-25 8/7/2018	OC-GW-78S 8/6/2018	OC-GW-79S 8/7/2018	OC-PZ-16RRR 8/7/2018	OC-PZ-17RRR 8/7/2018	OC-GW-18R 8/7/2018	OC-PZ-24 8/6/2018	OC-PZ-25 8/6/2018
Metals, Filtered (mg/L)										
Aluminum	1.5	0.2 U	0.2 U	0.2 U	0.2 U	0.1 J	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	0.37	0.0031 J	0.003 J	0.003 J	0.012	0.014	0.0086	0.011	0.034	0.01
Inorganics (mg/L)										
Nitrogen, as Ammonia	120	33	76	35	72	37	42	33	26	34
Chloride	310	190	280	10	220	270	20	280	9.3	30
Sulfate	1500	170	40	480	430	540	480	240	790	450
Specific Conductance (mS/cm)	3600	1200	1100	1400	1800	2000	1500	1700	1900	1400

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Prepared by: KMS 11/27/18
Checked by: CTM 11/30/18

Table 2-3
Slurry Wall/Cap Analytical Results for Second Quarter 2018 Surface Water Sampling
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-ISCO1 5/22/2018	OC-ISCO2 5/22/2018	OC-ISCO3 5/22/2018	OC-PZ-16RRRSW 5/22/2018	OC-PZ-17RRRSW 5/22/2018	OC-PZ-18RSW 5/22/2018	DUP PZ18RSW 5/22/2018	OC-SD-17 5/22/2018
Metals, Total (mg/L)								
Aluminum	180 J	610	81 J	390	390	200	210	420
Chromium	14	63	1.0 J	50	73	14	14	78
Sodium	150000	140000	160000	150000	160000	150000	150000	160000
Metals, Filtered (mg/L)								
Aluminum	87 J	98 J	200 U	130 J	160 J	110 J	110 J	180 J
Chromium	8.8	15	0.05 U	21	40	9.3	9.1	45
Sodium	130000	120000	150000	130000	140000	140000	140000	140000
Inorganics (mg/L)								
Nitrogen, as Ammonia	17	29	1.2	31	32	18	17	29
Chloride	240	190	330	220	230	240	240	230
Sulfate	98	200	32	210	210	100	100	210
Nitrate as N	0.12	0.3	1.0	0.25	0.17	0.12	0.12	0.16
Nitrite as N	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Specific Conductance (mS/cm)	1100	1200	1200	1300	1300	1100	1100	1300

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - not detected,
value is the detection limit
J - value is estimated

Prepared by: KMS 11/27/18
Checked by: CTM 11/30/18

Table 3-1
Plant B Analytical Results for RGP Sampling (April 2018 - September 2018)
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	Plant B Influent OC-INF-041918 4/19/2018	Plant B Influent OC-INF-051618 5/16/2018	Plant B Influent OC-INF-061318 6/13/2018	IDW OC-T4-040418 4/4/2018	IDW OC-T10-040518 4/5/2018	IDW OC-T5-040618 4/6/2018	IDW OC-T11-040918 4/9/2018	IDW OC-T3-041018 4/10/2018	IDW OC-T4-041218 4/12/2018	IDW OC-T10-041318 4/13/2018
VOCs (mg/L)										
1,4-Dioxane										
Acetone										
Methylene chloride										
Phenolics, Total Recoverable	0.0056	0.005 U	0.0077 B	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
SVOCs (mg/L)										
Bis(2-Ethylhexyl)phthalate	0.026 J	0.03	0.16	0.005 U	0.00049 J	0.005 U	0.005 U	0.0012 J	0.005 U	0.00054 J
Diethylphthalate	0.0048 U	0.0005 U	0.0048 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Dimethylphthalate	0.0048 U	0.00015 J	0.0048 U	0.000068 J B	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
TPH (mg/L)										
Total Petroleum Hydrocarbons										
Total Metals (mg/L)										
Arsenic	0.0067 J	0.015 U	0.01 J	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Chromium, Hexavalent										
Copper										
Iron	5	3.6	9.8	0.026 J	0.05 U	0.05 U	0.05 U	0.046 J B	0.062	0.05 U
Lead										
Nickel	0.0014 J	0.0017 J	0.0016 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Zinc	0.025	0.028	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0083 J	0.011 B	0.016 B
Inorganic Compounds (mg/L)										
Chloride	200	180	310	250	260	260	270	270	280	290
Chlorine	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF
Nitrogen, as Ammonia										
Sulfate										
Total Suspended Solids	8	2.5 J	12	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Notes:
mg/L - milligrams per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated
B - Compound was found in the
blank and sample
* - LCS or LCSD exceeds the
control limits
E - Exceeded the calibration
range

Table 3-1
Plant B Analytical Results for RGP Sampling (April 2018 - September 2018)
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	IDW OC-T5-041718 4/17/2018	IDW OC-T11-041818 4/18/2018	IDW OC-T3-041918 4/19/2018	IDW OC-T4-042018 4/20/2018	IDW OC-T10-042318 4/23/2018	IDW OC-T11-042718 4/27/2018	IDW OC-T3-050218 5/2/2018	IDW OC-T4-050318 5/3/2018	IDW OC-T10-050418 5/4/2018	IDW OC-T5-050418 5/4/2018
VOCs (mg/L)										
1,4-Dioxane										
Acetone										
Methylene chloride										
Phenolics, Total Recoverable	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
SVOCs (mg/L)										
Bis(2-Ethylhexyl)phthalate	0.00044 J	0.0024 J	0.0006 J	0.005 U	0.00053 J	0.0006 J	0.005 U	0.005 U	0.0048 U	0.0048 U
Diethylphthalate	0.00048 U	0.00048 U	0.00048 U	0.0005 U	0.00048 U	0.0005 U	0.000066 J	0.0005 U	0.00015 J B	0.00014 J B
Dimethylphthalate	0.00048 U	0.00048 U	0.00048 U	0.0005 U	0.00048 U	0.0005 U	0.0005 U	0.0005 U	0.00048 U	0.00048 U
TPH (mg/L)										
Total Petroleum Hydrocarbons										
Total Metals (mg/L)										
Arsenic	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Chromium, Hexavalent										
Copper										
Iron	0.05 U	0.05 U	0.041 J	0.34	0.05 U	0.05 U	0.044 J	0.079	0.05 U	0.05 U
Lead										
Nickel	0.01 U	0.01 U	0.0014 J	0.01 U	0.01 U	0.01 U	0.01 U	0.0016 J	0.01 U	0.01 U
Zinc	0.044	0.01 U	0.03	0.007 J B	0.0093 J B	0.0031 J	0.005 J B	0.01 B	0.006 J	0.0057 J
Inorganic Compounds (mg/L)										
Chloride	280	290	300	280	280	290	250	260	250	260
Chlorine	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF
Nitrogen, as Ammonia										
Sulfate										
Total Suspended Solids	5 U	5 U	5 U	2 J	5 U	5 U	5 U	5 U	5 U	5 U

Notes:
mg/L - milligrams per liter
U - analyte not detected, value shown is detection limit
J - value is estimated
B - Compound was found in the blank and sample
* - LCS or LCSD exceeds the control limits
E - Exceeded the calibration range

Table 3-1
Plant B Analytical Results for RGP Sampling (April 2018 - September 2018)
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	IDW OC-T11-050818 5/8/2018	IDW OC-T3-051418 5/14/2018	IDW OC-T4-051518 5/15/2018	IDW OC-T10-051618 5/16/2018	IDW OC-T11-051718 5/17/2018	IDW OC-T5-051718 5/17/2018	IDW OC-T3-052318 5/23/2018	IDW OC-T4-052418 5/24/2018	IDW OC-T10-052518 5/25/2018	IDW OC-T11-053018 5/30/2018
VOCs (mg/L)										
1,4-Dioxane										
Acetone										
Methylene chloride										
Phenolics, Total Recoverable	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
SVOCs (mg/L)										
Bis(2-Ethylhexyl)phthalate	0.005 U	0.0018 J	0.00086 J	0.0017 J	0.00046 J	0.002 J	0.00086 J	0.0048 U	0.0048 U	0.00079 J
Diethylphthalate	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.00048 U	0.00048 U	0.00048 U	0.0005 U
Dimethylphthalate	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.00048 U	0.00048 U	0.00048 U	0.0005 U
TPH (mg/L)										
Total Petroleum Hydrocarbons										
Total Metals (mg/L)										
Arsenic	0.015 U		0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Chromium, Hexavalent										
Copper										
Iron	0.05 U		0.1	0.05 U	0.05 U	0.05 U	0.06	0.099	0.05 U	0.05 U
Lead										
Nickel	0.01 U		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Zinc	0.0037 J		0.018	0.016	0.0072 J	0.0042 J	0.013	0.013	0.01 U	0.01 U
Inorganic Compounds (mg/L)										
Chloride	300	310	300	250	270	270	310	300	220	260
Chlorine	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF
Nitrogen, as Ammonia										
Sulfate										
Total Suspended Solids	2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Notes:
mg/L - milligrams per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated
B - Compound was found in the
blank and sample
* - LCS or LCSD exceeds the
control limits
E - Exceeded the calibration
range

Table 3-1
Plant B Analytical Results for RGP Sampling (April 2018 - September 2018)
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Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	IDW OC-T5-053118 5/31/2018	IDW OC-T3-060518 6/5/2018	IDW OC-T4-060618 6/6/2018	IDW OC-T10-060718 6/7/2018	IDW OC-T11-061218 6/12/2018	IDW OC-T5-061318 6/13/2018	IDW OC-T3-061818 6/18/2018	IDW OC-T4-061918 6/19/2018	IDW OC-T10-062018 6/20/2018
VOCs (mg/L)									
1,4-Dioxane									
Acetone									
Methylene chloride									
Phenolics, Total Recoverable	0.0068	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
SVOCs (mg/L)									
Bis(2-Ethylhexyl)phthalate	0.005 U	0.005 U	0.00056 J	0.005 U	0.005 U	0.00057 J	0.0048 U	0.0048 U	0.00044 J
Diethylphthalate	0.0005 U	0.0005 U	0.0005 U *	0.0005 U *	0.0005 U	0.00048 U	0.00048 U	0.00048 U	0.0005 U
Dimethylphthalate	0.0005 U	0.0005 U	0.0005 U *	0.0005 U *	0.0005 U	0.00048 U	0.00048 U	0.00048 U	0.0005 U
TPH (mg/L)									
Total Petroleum Hydrocarbons									
Total Metals (mg/L)									
Arsenic	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Chromium, Hexavalent									
Copper									
Iron	0.05 U	0.076	0.18	0.05 U	0.03 J	0.05 U	0.083	0.08	0.05 U
Lead									
Nickel	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Zinc	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Inorganic Compounds (mg/L)									
Chloride	270	230	290 F2	270	310	320	330	310	290
Chlorine	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF
Nitrogen, as Ammonia									
Sulfate									
Total Suspended Solids	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Notes:
mg/L - milligrams per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated
B - Compound was found in the
blank and sample
* - LCS or LCSD exceeds the
control limits
E - Exceeded the calibration
range

Table 3-1
Plant B Analytical Results for RGP Sampling (April 2018 - September 2018)
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	IDW OC-T11-062118 6/21/2018	IDW OC-T5-062218 6/22/2018	IDW OC-T3-062618 6/26/2018	IDW OC-T4-062718 6/27/2018	IDW OC-T10-070918 7/9/2018	IDW OC-T11-070918 7/9/2018	IDW OC-T3-070918 7/9/2018	IDW OC-T4-070918 7/9/2018	IDW OC-T5-070918 7/9/2018	IDW OC-T3-072518 7/25/2018
VOCs (mg/L)										
1,4-Dioxane					0.0004 U	0.0004 U	0.0004 U	0.00032 J	0.0004 U	0.0004 U
Acetone					0.0018 J *	0.0013 J *	0.0018 J *	0.002 J *	0.0022 J *	0.0011 J
Methylene chloride					0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0014 J
Phenolics, Total Recoverable	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.0054 J	0.01 U	0.033	0.01 U	0.01 U
SVOCs (mg/L)										
Bis(2-Ethylhexyl)phthalate	0.00056 J	0.00046 J	0.005 U	0.005 U	0.01 U	0.01 U	0.01 U	0.0025 J	0.01 U	0.01 U
Diethylphthalate	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U *
Dimethylphthalate	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U *
TPH (mg/L)										
Total Petroleum Hydrocarbons					5.6 U	5.8 U	5.8 U	2.2 J	5.9 U F1	5.5 U
Total Metals (mg/L)										
Arsenic	0.015 U	0.015 U	0.015 U	0.015 U	0.00082 J	0.00077 J	0.00061 J	0.0006 J	0.00087 J	0.00087 J
Chromium, Hexavalent					0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U
Copper					0.0055	0.002 U	0.002 U	0.002 U	0.00074 J	0.01
Iron	0.05 U	0.05 U	0.076	0.056	0.1 U	0.1 U	0.28	0.17	0.1 U	0.079 J
Lead					0.00028 J B	0.00028 J B	0.0005 U	0.0005 U	0.00016 J B	0.0005 U
Nickel	0.01 U	0.01 U	0.01 U	0.01 U	0.002 U	0.002 U	0.0011 J	0.002 U	0.002 U	0.0013 J
Zinc	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Inorganic Compounds (mg/L)										
Chloride	330	340	200	290	290	280	280	280	270	270
Chlorine	0.2 U HF	0.2 U HF	0.2 U HF	0.2 U HF	0.02 U HF	0.01 J HF	0.02 U HF	0.01 J HF	0.02 U HF	0.02 U HF
Nitrogen, as Ammonia					0.16 J B	0.19 J B	0.1 J B	0.15 J B	0.14 J B	0.11 J F1
Sulfate					60	56	46	50	48	49
Total Suspended Solids	5 U	5 U	5 U	5 U	4 U	4 U	4 U	4 U	4 U	4 U

Notes:
mg/L - milligrams per liter
U - analyte not detected, value shown is detection limit
J - value is estimated
B - Compound was found in the blank and sample
* - LCS or LCSD exceeds the control limits
E - Exceeded the calibration range

Table 3-1
Plant B Analytical Results for RGP Sampling (April 2018 - September 2018)
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	IDW OC-T4-072518 7/25/2018	IDW OC-T5-072618 7/26/2018	IDW OC-T10-080618 8/6/2018	IDW OC-T11-080718 8/7/2018
VOCs (mg/L)				
1,4-Dioxane	0.0004 U	0.0004 U	0.0004 U	0.0004 U
Acetone	0.0014 J	0.0015 J	0.0029 J	0.0018 J
Methylene chloride	0.0019 J	0.005 U	0.005 U	0.005 U
Phenolics, Total Recoverable	0.01 U	0.029	0.0056 J	0.01 U
SVOCs (mg/L)				
Bis(2-Ethylhexyl)phthalate	0.01 U	0.01 U	0.01 U	0.01 U
Diethylphthalate	0.005 U *	0.005 U *	0.005 U *	0.005 U *
Dimethylphthalate	0.005 U *	0.005 U	0.005 U *	0.005 U *
TPH (mg/L)				
Total Petroleum Hydrocarbons	5.3 U	4.8 U	3.3 J B *	5.3 U
Total Metals (mg/L)				
Arsenic	0.00056 J	0.00065 J	0.00075 J	0.00059 J
Chromium, Hexavalent	0.00018 J	0.0003 U	0.0003 U	0.0003 U
Copper	0.002 U	0.002 U	0.0007 J	0.002 U
Iron	0.14	0.1 U	0.1 U	0.1 U
Lead	0.0005 U	0.0005 U	0.00034 J	0.00017 J
Nickel	0.002 U	0.0015 J	0.0018 J	0.0017 J
Zinc	0.02 U	0.01 J	0.02 U	0.02 U
Inorganic Compounds (mg/L)				
Chloride	270	300	280	270
Chlorine	0.02 U HF	0.02 U HF	0.02 U HF	0.02 U HF
Nitrogen, as Ammonia	0.2 U	0.17 J B	0.15 J B	0.14 J
Sulfate	51	53	51	51
Total Suspended Solids	4 U	4 U	4 U	4 U

Notes:
mg/L - milligrams per liter
U - analyte not detected, value shown is detection limit
J - value is estimated
B - Compound was found in the blank and sample
* - LCS or LCSD exceeds the control limits
E - Exceeded the calibration range

Prepared by: KMS 11/27/18
Checked by: CTM 11/30/18

Table 3-2
Plant B Analytical Results for Second Quarter 2018 Groundwater Sampling
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-16R 5/21/2018
Volatile Organics (mg/L)	
2,4,4-Trimethyl-1-pentene	1.1
2,4,4-Trimethyl-2-pentene	0.36
Semivolatile Organics (mg/L)	
Bis(2-Ethylhexyl)phthalate	0.11 U
N-Nitrosodiphenylamine	0.041 J
Metals, Filtered (mg/L)	
Iron	2.4
Inorganics (mg/L)	
Nitrogen, as Ammonia	3.5
pH	6.8 J
Volatile Petroleum Hydrocarbons (mg/L)	
Benzene	0.02 U
C5-C8 Aliphatics	2.2
C5-C8 Aliphatics (unadj.)	2.2
C9-C10 Aromatics (unadj.)	0.017 J
C9-C12 Aliphatics	0.56
C9-C12 Aliphatics (unadj.)	0.59
Ethylbenzene	0.02 U
Methyl Tertbutyl Ether	0.02 U
Naphthalene	0.02 U
Toluene	0.018 J
Xylene, o	0.016 J
Xylenes (m&p)	0.04 U

Notes:
mg/L - milligrams per liter
U - analyte not detected,
value shown is reporting limit
J - value is estimated

Prepared by: KMS 11/27/18
Checked by: CTM 11/30/18

Table 3-3
Plant B Analytical Results for Third Quarter 2018 Groundwater Sampling
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-16R 8/8/2018
Volatile Organics (mg/L)	
2,4,4-Trimethyl-1-pentene	1.6
2,4,4-Trimethyl-2-pentene	0.63 J
Semivolatile Organics (mg/L)	
Bis(2-Ethylhexyl)phthalate	0.025 U
N-Nitrosodiphenylamine	0.056
Metals, Filtered (mg/L)	
Iron	2.0
Inorganics (mg/L)	
Nitrogen, as Ammonia	4.0
pH	6.7 J
Volatile Petroleum Hydrocarbons (mg/L)	
Benzene	0.05 U
C5-C8 Aliphatics	2.1
C5-C8 Aliphatics (unadj.)	2.2
C9-C10 Aromatics (unadj.)	0.25 U
C9-C12 Aliphatics	0.42
C9-C12 Aliphatics (unadj.)	0.42
Ethylbenzene	0.05 U
Methyl Tertbutyl Ether	0.05 U
Naphthalene	0.05 U
Toluene	0.014 J
Xylene, o	0.05 U
Xylenes (m&p)	0.1 U

Notes:
mg/L - milligrams per liter
U - analyte not detected,
value shown is reporting limit
J - value is estimated

Prepared by: KMS 11/27/18
Checked by: CTM 11/30/18

Table 5-1
Private Well Analytical Results for Second Quarter 2018
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-M01L6C 6/12/2018	OC-M01L6D 6/12/2018	OC-M02L07 6/12/2018	OC-M03L02 6/13/2018	OC-M03L2D 6/13/2018	OC-M03L2F 6/13/2018	OC-M03L07 6/12/2018	OC-M14L2B 6/12/2018
NDMA/NDPA (ng/L)								
N-Nitrosodi-n-propylamine	2.1 U	2 U	2.1 U	2.1 U	2.1 U	2 UJ	2 U	2.1 U
N-Nitrosodimethylamine	2.1 U	2 U	2.1 U	2.1 U	2.1 U	2 U	2 U	2.1 U
Semivolatile Organics (mg/L)								
Bis(2-Ethylhexyl)phthalate			0.0037 J					
Metals, Total (mg/L)								
Chromium			0.01 U					0.01 U
Chromium, Hexavalent			0.01 U					0.01 U
Sodium			7.4					25
Inorganics (mg/L)								
Nitrogen, as Ammonia			0.2					0.22
Chloride			19					18
Sulfate			18					61
Nitrate as N			5					0.05 U
Nitrite as N			0.05 U					0.05 U

Notes:
mg/L - milligram per liter
ng/L - nanograms per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Table 5-1
Private Well Analytical Results for Second Quarter 2018
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-M24L116 6/12/2018	OC-M24L54 6/12/2018	OC-M24L63 6/13/2018	OC-M24L64 6/13/2018	OC-M24L66 6/12/2018	OC-M24L72A 6/13/2018	OC-M24L94 6/12/2018	OC-M27L14C 6/12/2018
NDMA/NDPA (ng/L)								
N-Nitrosodi-n-propylamine	2.1 U	2.1 U	2 UJ	2.1 UJ	2.1 U	2.1 UJ	2 U	2 U
N-Nitrosodimethylamine	0.6 J	12	2 U	2.1 U	2.1 U	2.1 U	2.1	2 U
Semivolatile Organics (mg/L)								
Bis(2-Ethylhexyl)phthalate		0.0048 U	0.0048 U	0.0048 U			0.0048 U	0.0048 U
Metals, Total (mg/L)								
Chromium		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0066 J	0.01 U
Chromium, Hexavalent		0.01 U	0.01 U	0.01 U			0.01 U	0.01 U
Sodium		30	20	19	19	20	28	42
Inorganics (mg/L)								
Nitrogen, as Ammonia		0.22	0.2 U	0.2 U	0.17 J	0.2 U	0.15 J	0.18 J
Chloride		89	110	110	95	130	110	170
Sulfate		26	20	19	16	12	22	38
Nitrate as N		0.05 U	0.59	0.61	0.15	0.55	0.32	0.056
Nitrite as N		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

Notes:
mg/L - milligram per liter
ng/L - nanograms per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Prepared by: KMS 11/27/18
Checked by: KALS 11/30/2018

Table 5-2
Private Well Analytical Results for Third Quarter 2018
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-M01L6C 9/25/2018	OC-M01L6D 9/25/2018	OC-M02L07 9/25/2018	OC-M03L02 9/25/2018	OC-M03L2D 9/25/2018	OC-M03L07 9/25/2018	OC-M14L2B 9/25/2018	OC-M15L2C 9/26/2018
NDMA/NDPA (ng/L)								
N-Nitrosodi-n-propylamine	2 U	2.1 U	2.1 U	2 U	2.1 U	2 U	2 U	2 U
N-Nitrosodimethylamine	0.58 J	2.1 U	2.1 U	2 U	2.1 U	2 U	2 U	2 U
Metals, Total (mg/L)								
Chromium			0.01 U				0.01 U	0.01 U
Chromium, Hexavalent			0.01 U				0.01 UJ	0.01 UJ
Sodium			10				24	22
Inorganics (mg/L)								
Nitrogen, as Ammonia			0.2 U				0.2 U	0.2 U
Chloride			29				18	120
Nitrate as N			6.3				0.05 U	0.12
Nitrite as N			0.05 U				0.05 U	0.05 U
Sulfate			22				51	31

Notes:
mg/L - milligram per liter
ng/L - nanograms per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated

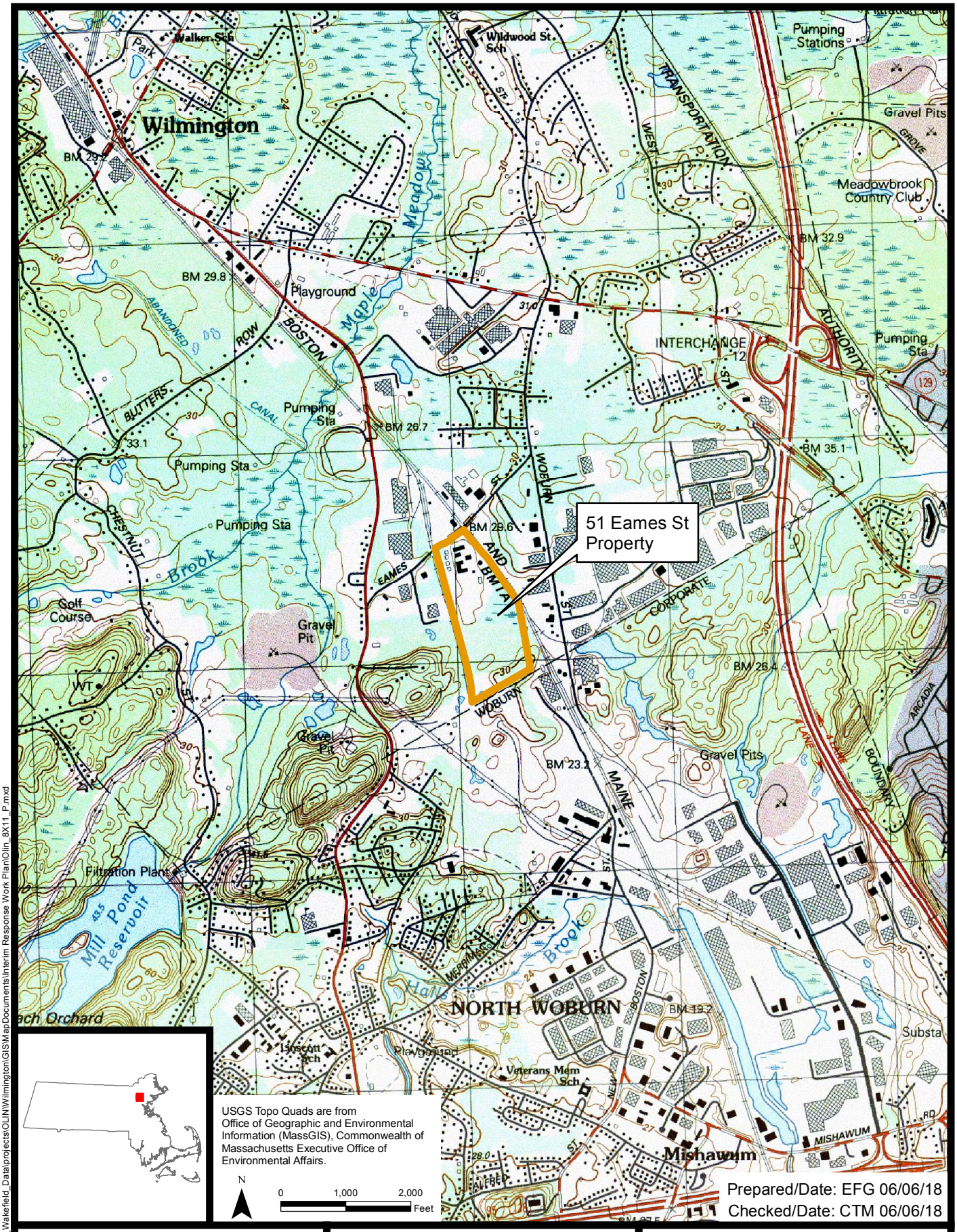
Table 5-2
Private Well Analytical Results for Third Quarter 2018
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-M24L54 9/25/2018	OC-M24L63 9/26/2018	OC-M24L64 9/26/2018	OC-M24L66 9/26/2018	OC-M24L72A 9/26/2018	OC-M24L94 9/26/2018	OC-M27L14C 9/25/2018
NDMA/NDPA (ng/L)							
N-Nitrosodi-n-propylamine	2 U	2 U	2 U	2 U	2 U	2 U	2.1 U
N-Nitrosodimethylamine	15	2 U	2 U	2 U	2.9	2 U	2.1 U
Metals, Total (mg/L)							
Chromium	0.01 U	0.01 U	0.01 U	0.01 U	0.0063 J	0.01 U	0.01 U
Chromium, Hexavalent	0.01 U	0.01 U	0.01 U			0.01 U	0.01 U
Sodium	31	18	18	22	15	23	42
Inorganics (mg/L)							
Nitrogen, as Ammonia	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.21 U	0.2 U
Chloride	88	130	130	140	100	140	160
Nitrate as N	0.05 U	0.5	0.49	0.24	8.9	0.05 U	0.17
Nitrite as N	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Sulfate	27	24	24	22	23	22	41

Notes:
mg/L - milligram per liter
ng/L - nanograms per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Prepared by: KMS 11/27/18
Checked by: KALS 11/30/2018

Figures

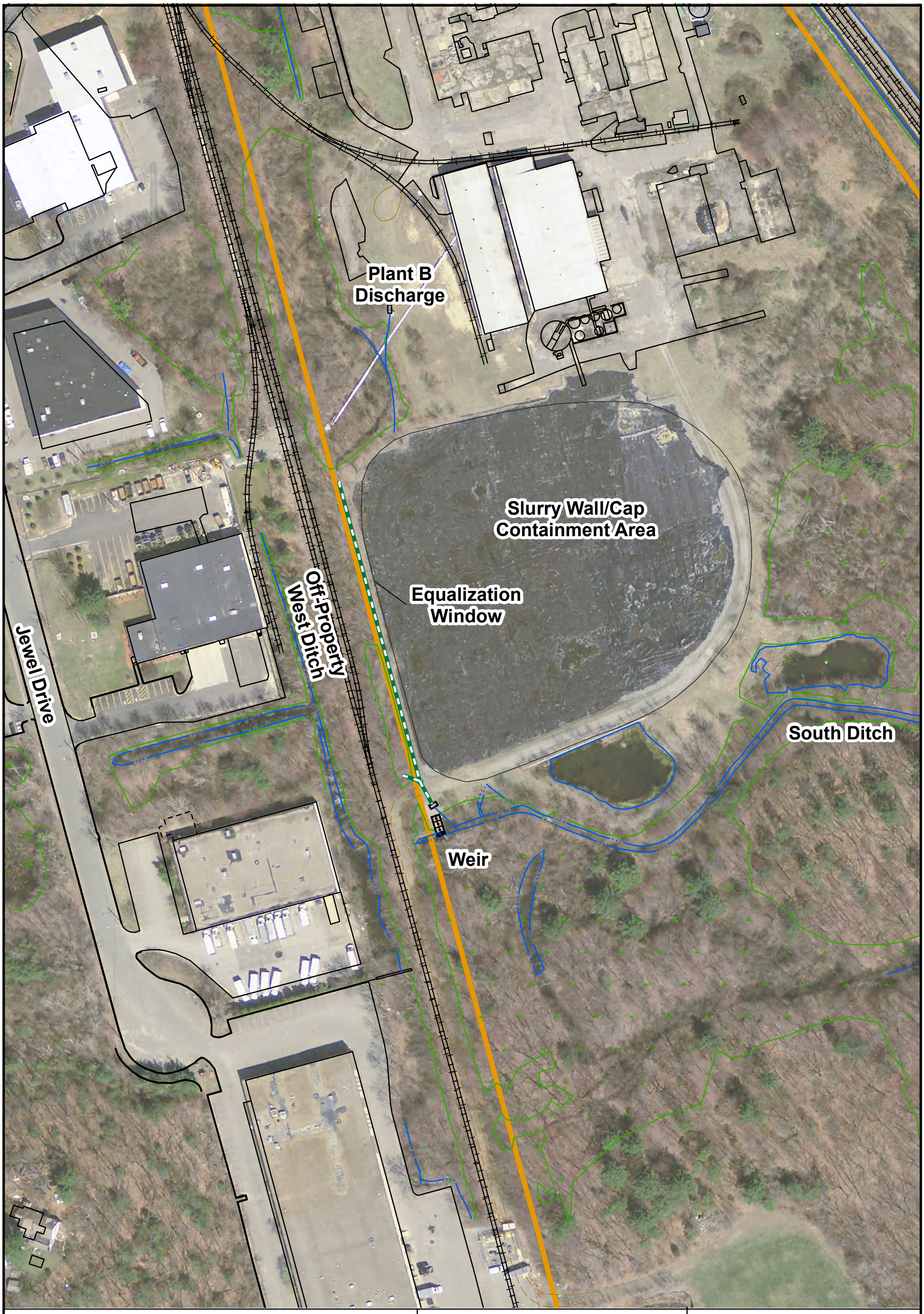


Olin Chemical Superfund Site
Wilmington, Massachusetts

wood.

Figure 1-1
Site Location
Semi-Annual Status Report No. 23

Document: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_8X11_P.mxd



Legend

- Railroad
- Water
- Culvert
- Site Boundary
- Wetland Boundary
- Paved Road
- Unpaved Road
- Railroad
- Structure
- Water
- Culvert
- Trail

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 60 120 240 Feet

Figure 1-2
Site Plan

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/06/18 | Checked/Date: CTM 06/06/18

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd June 06, 2018 DWN: emily.gardiner CHKD: AKN

GW-43SR
81.59

GW-26

GW-10S
81.47

GW-35S
81.66

GW-201S
79.61

GW-76S
81.45

GW-CA1
81.59

GW-34SR
82.99

GW-34D
82.91

GW-24
81.31

GW-25
81.17

GW-42S

GW-79S
78.54

PZ-16RR

PZ-24
81.08

GW-202D
80.95

PZ-25
80.84

GW-202S
80.77

GW-78S
80.68

PZ-17RRR

PZ-18R/IN
80.62

GW-55S
79.29

GW-55D
79.34

GW-39
76.40

82

81

83

82

81

80

79

80

Legend

- Monitoring Well
- Interpreted Groundwater Contour (FT/MSL)
- Site Boundary
- Wetland Boundary
- Paved Road
- Unpaved Road
- Railroad
- Structure
- Water
- Culvert
- Trail

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 60 120 240 Feet

Figure 2-1
Slurry Wall / Cap Interpreted Water Level Contours - Second Quarter 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/21/18 | Checked/Date: CTM 12/21/18

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd December 21, 2018 DWN: emily.gardiner CHKD: AKN

GW-43SR
81.02

GW-26

GW-10S
81.12

GW-35S
81.10

GW-201S
79.56

GW-76S
81.18

GW-CA1
81.13

GW-34SR
82.91

GW-34D
82.86

GW-24
80.98

GW-42S

GW-25
80.52

GW-79S
76.93

PZ-16RR

PZ-24
80.46

GW-202D
80.25

PZ-25
80.32

GW-202S
80.37

GW-78S
80.15

PZ-17RRR

PZ-18R/IN
80.41

GW-55S
79.03

GW-55D
79.15

GW-39
76.00

83

82

81

80

79

Legend

- Monitoring Well
- Interpreted Groundwater Contour (FT/MSL)
- Site Boundary
- Wetland Boundary
- Paved Road
- Unpaved Road
- Railroad
- Structure
- Water
- Culvert
- Trail

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

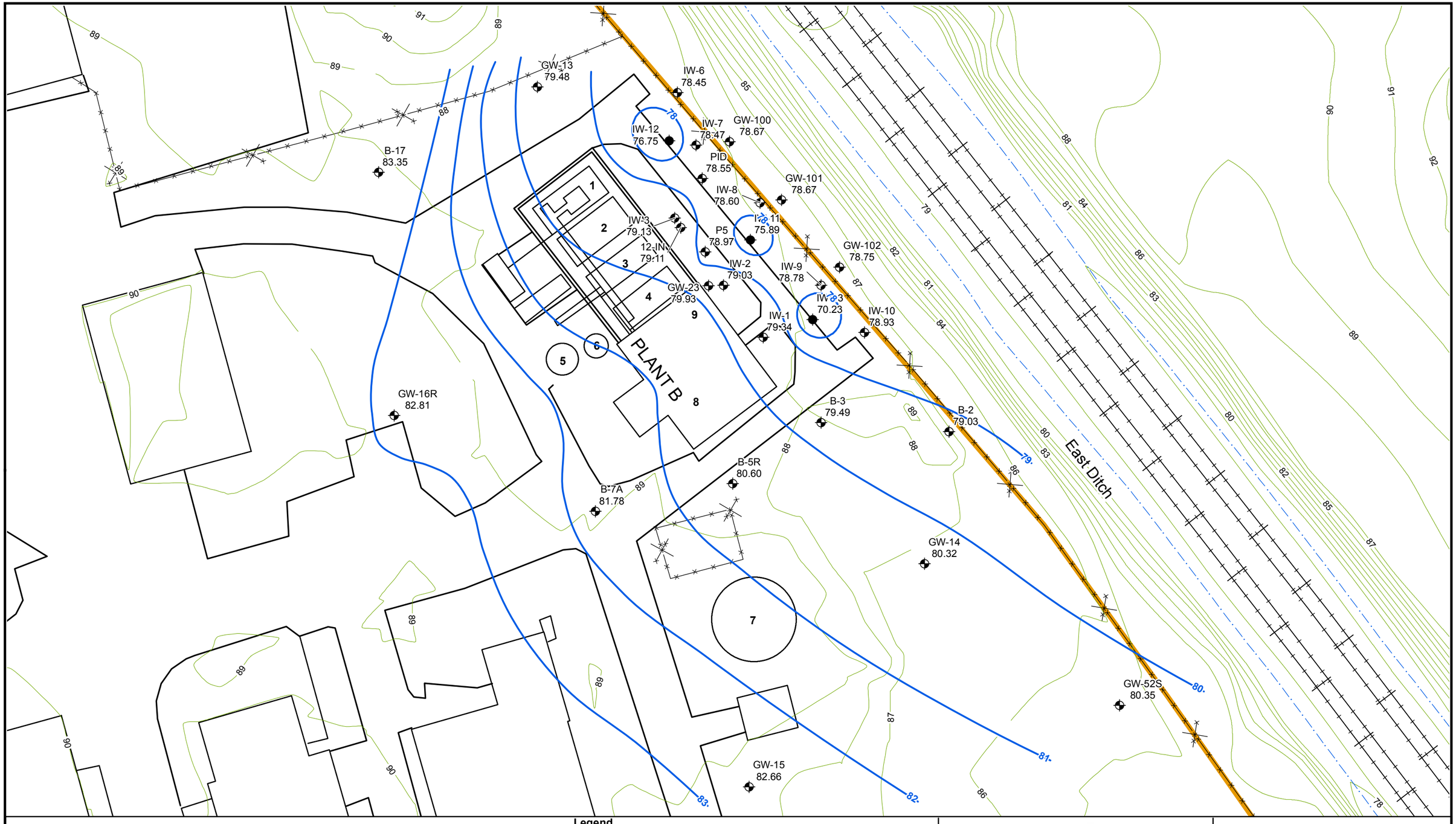
0 60 120 240 Feet

Figure 2-2
Slurry Wall / Cap Interpreted Water Level Contours - Third Quarter 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/16/18 | Checked/Date: CTM 12/16/18

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd December 16, 2018 DWN: emily.gardiner CHKD: AKN



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

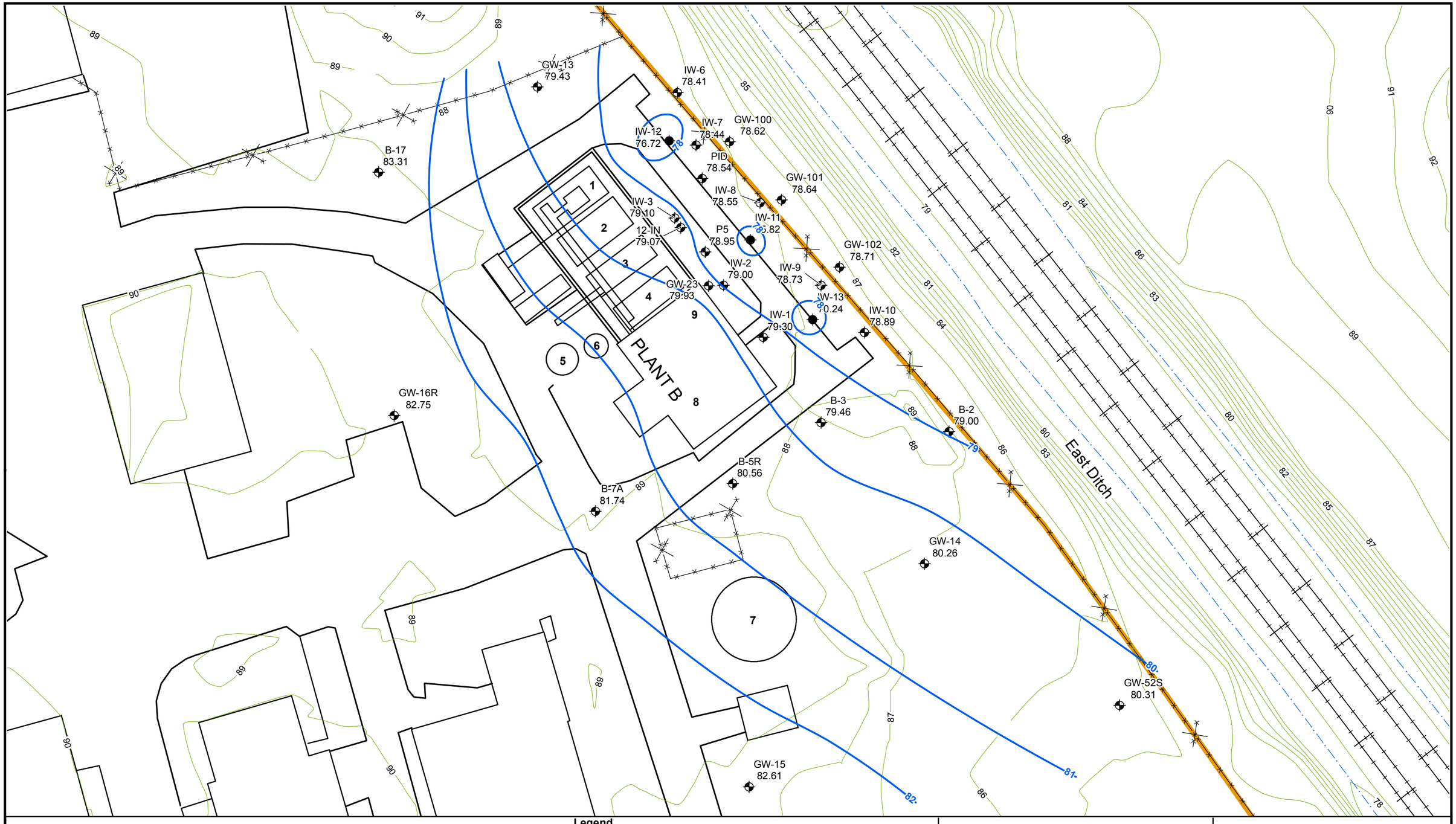
0 15 30 60 Feet

Figure 3-1
Plant B Interpreted Water Level Conditions - April 27, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18.mxd December 14, 2018 DWN: emily.gardiner CHKD: CTM



Legend

Interpreted Potentiometric Contour Line (FT/MSL)
Recovery Well
Monitoring Well
Ditch
Elevation Contours
Site Boundary
Fence
Railroad

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

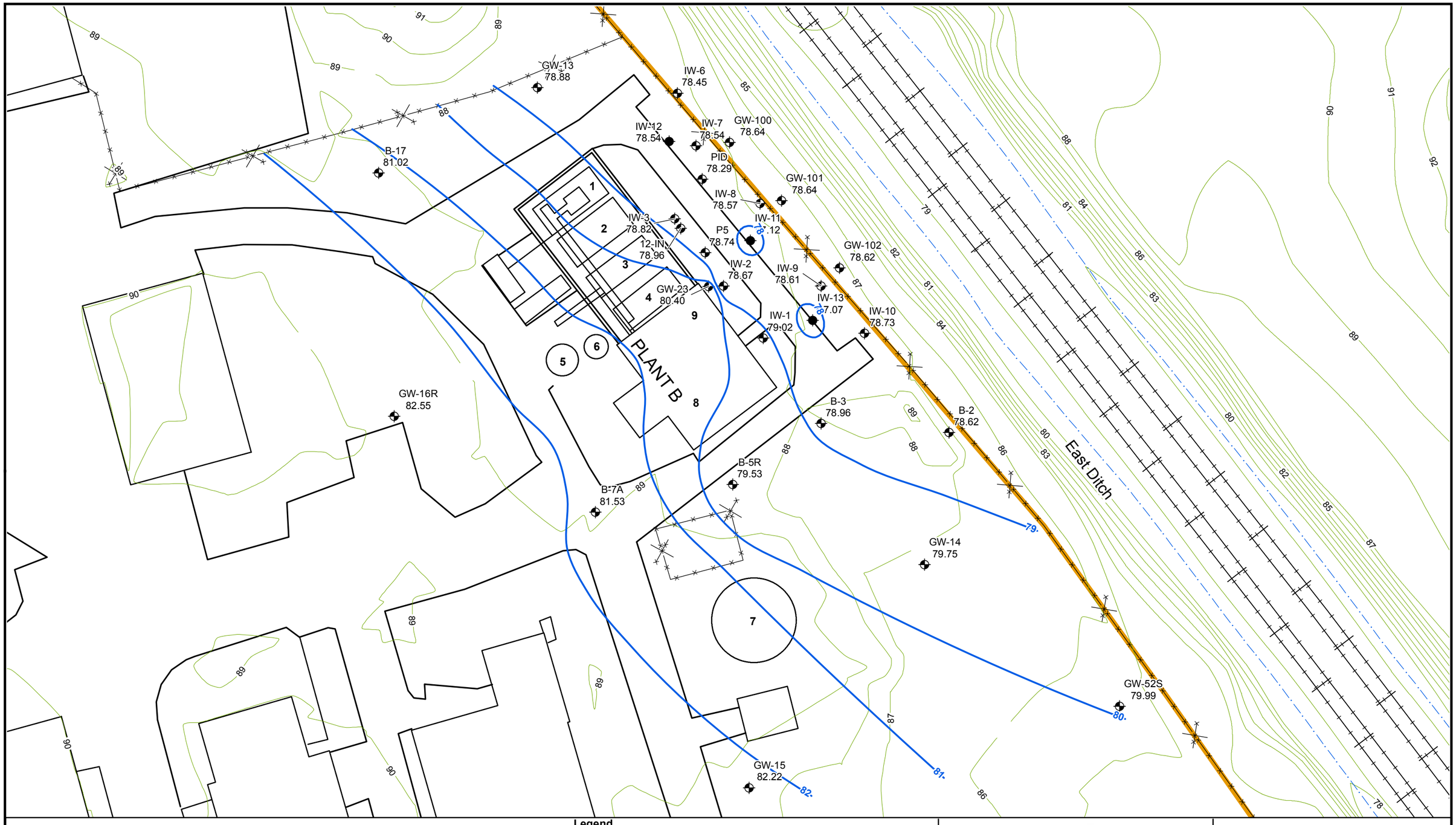
N

0 15 30 60 Feet

Figure 3-2
Plant B Interpreted Water Level Conditions - May 31, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

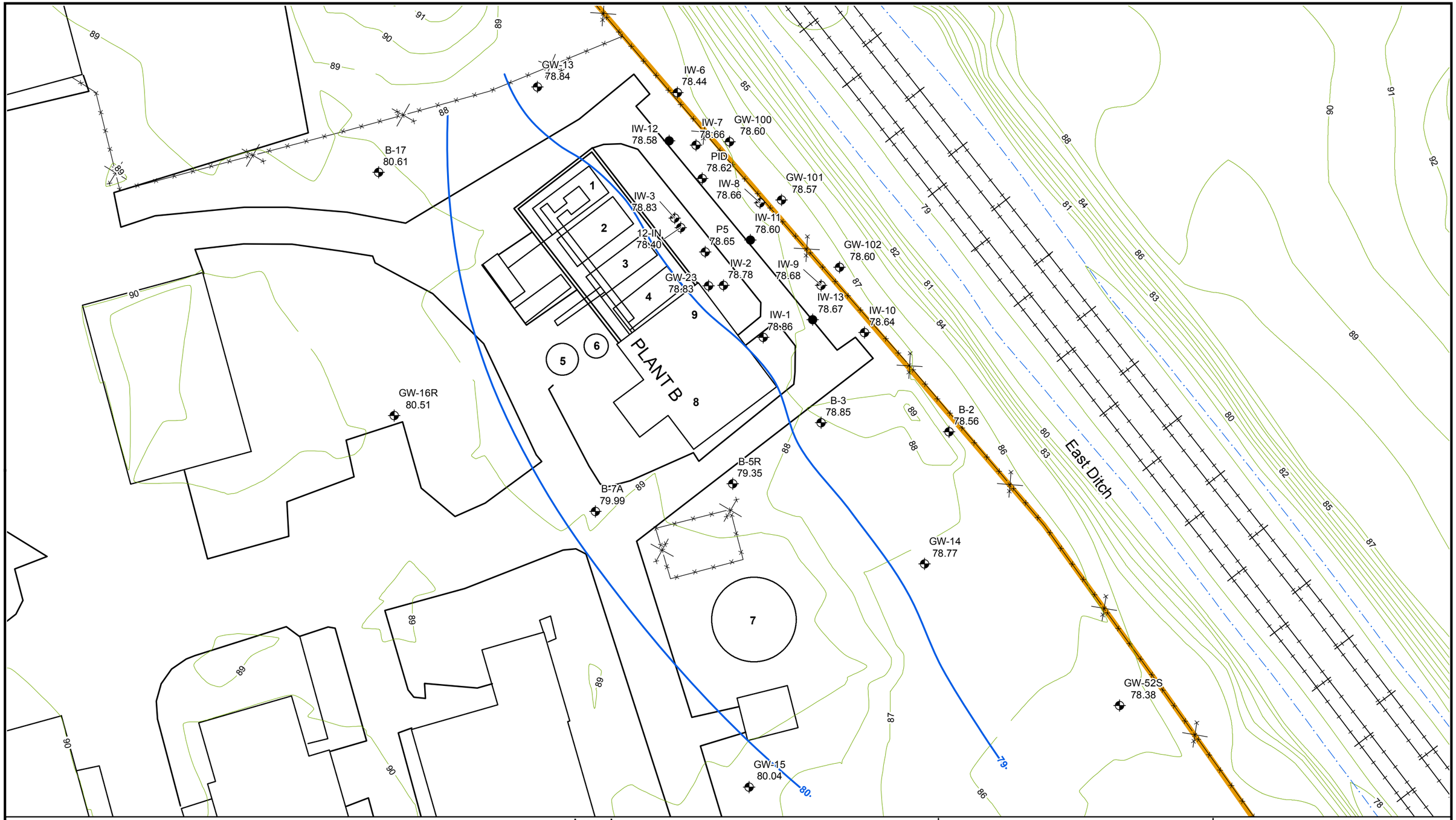
N

0 15 30 60 Feet

Figure 3-3
Plant B Interpreted Water Level Conditions - June 29, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-4
Plant B Interpreted Water Level Conditions - July 26, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18

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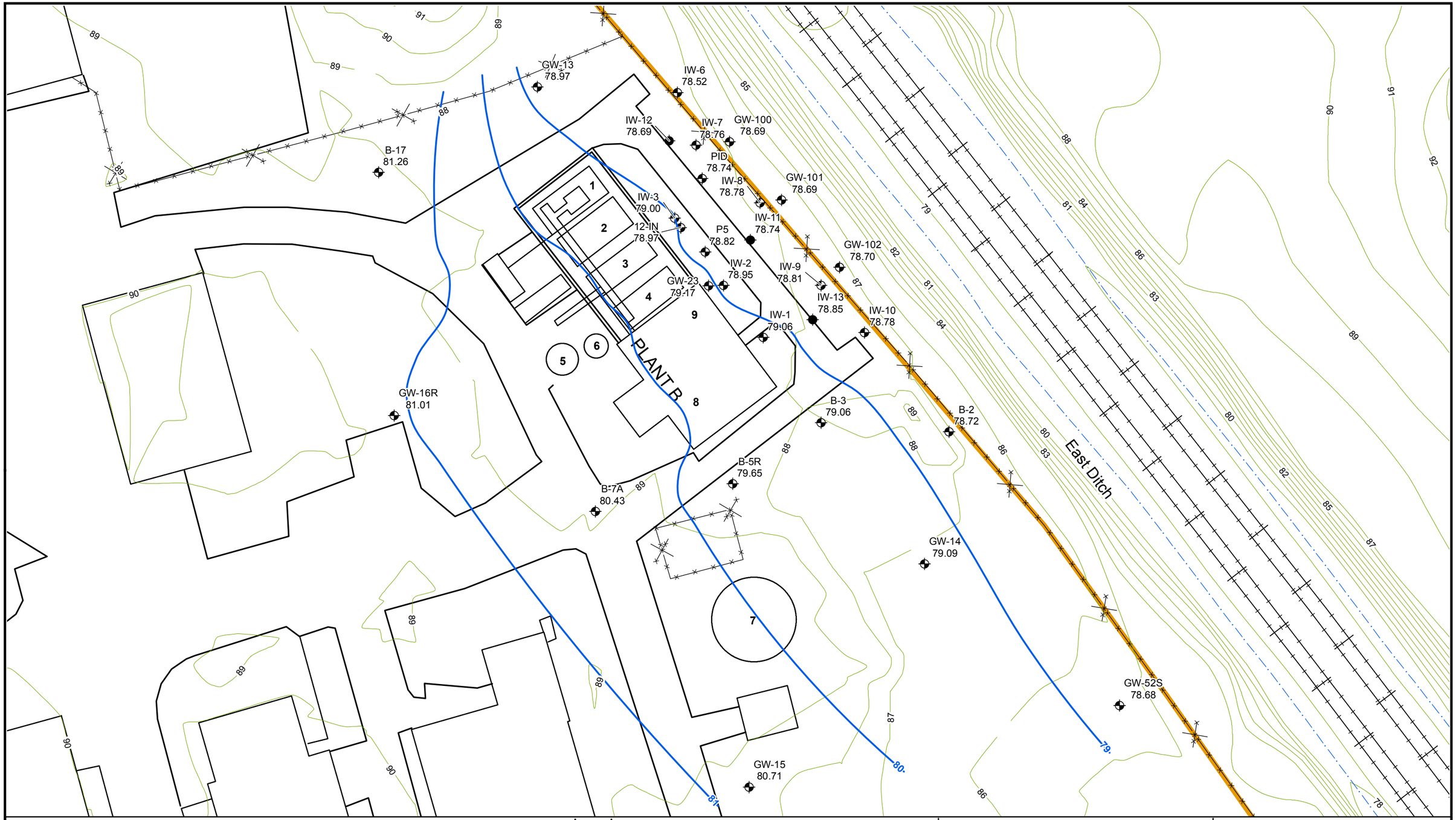


Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

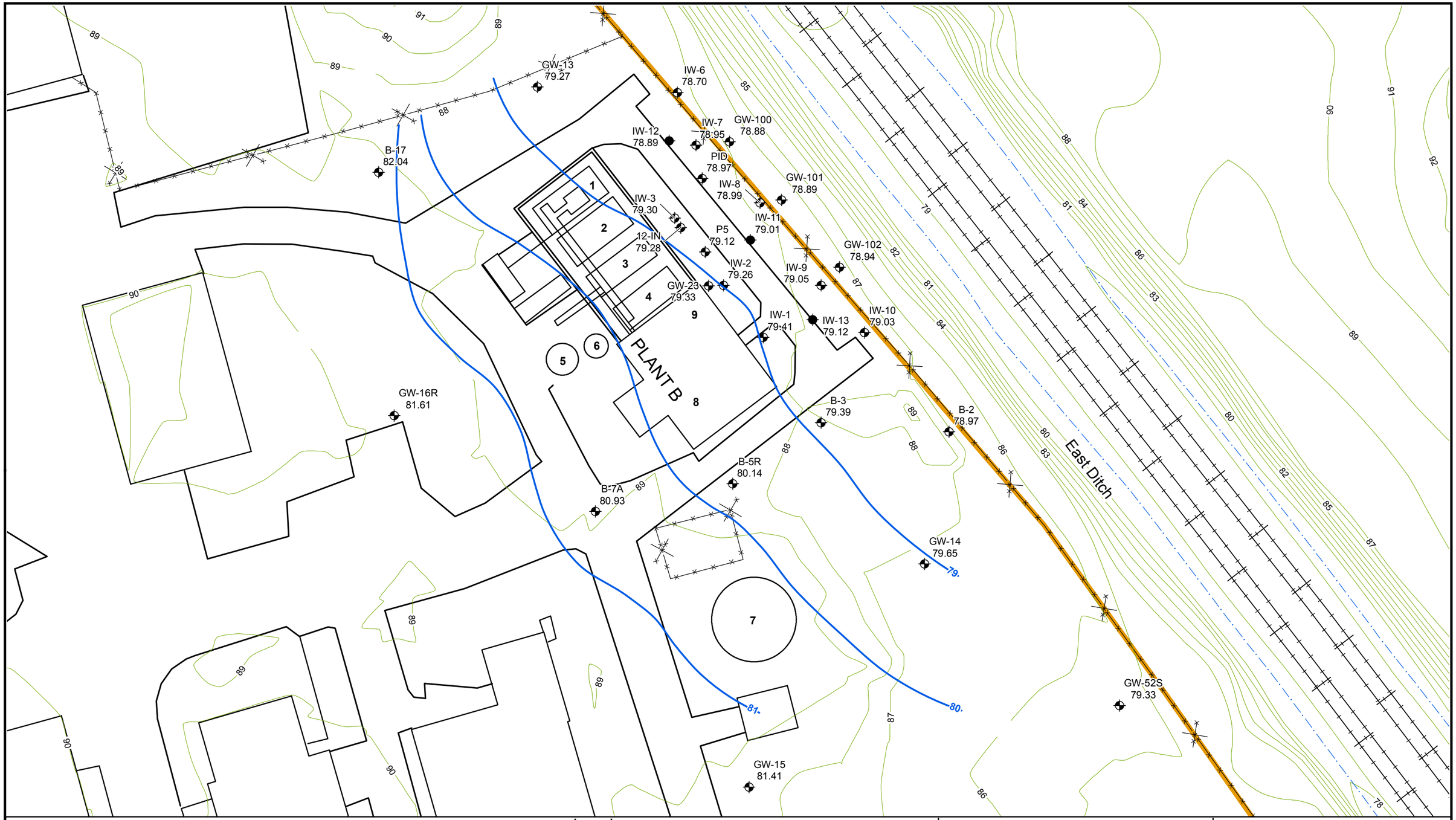
N

0 15 30 60 Feet

Figure 3-5
Plant B Interpreted Water Level Conditions - August 31, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-6
Plant B Interpreted Water Level Conditions - October 1, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18

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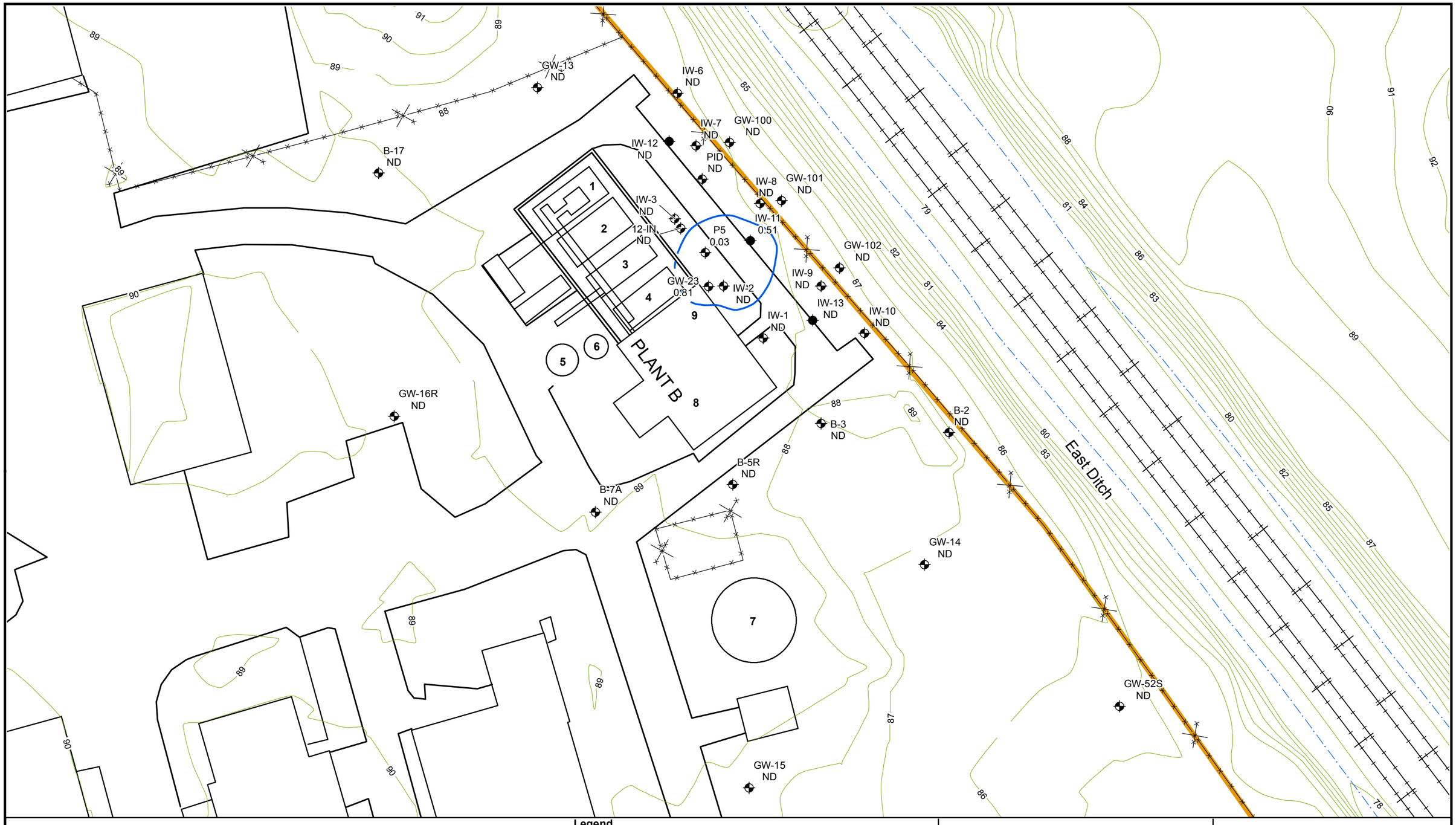

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

Type

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-7
Plant B Interpreted LNAPL Thickness Contours - April 27, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18

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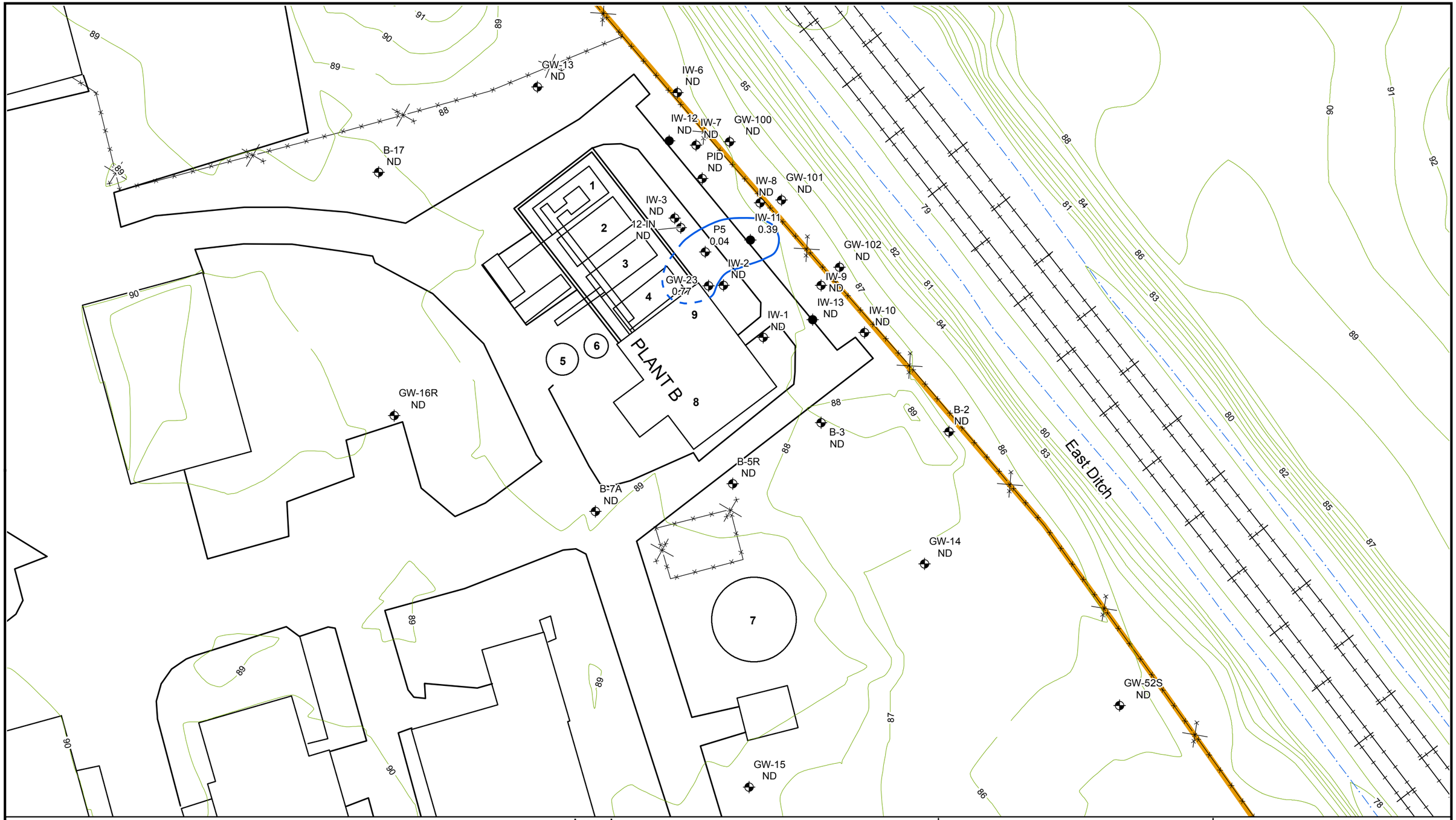

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

Type

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-8
Plant B Interpreted LNAPL Thickness Contours - May 31, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

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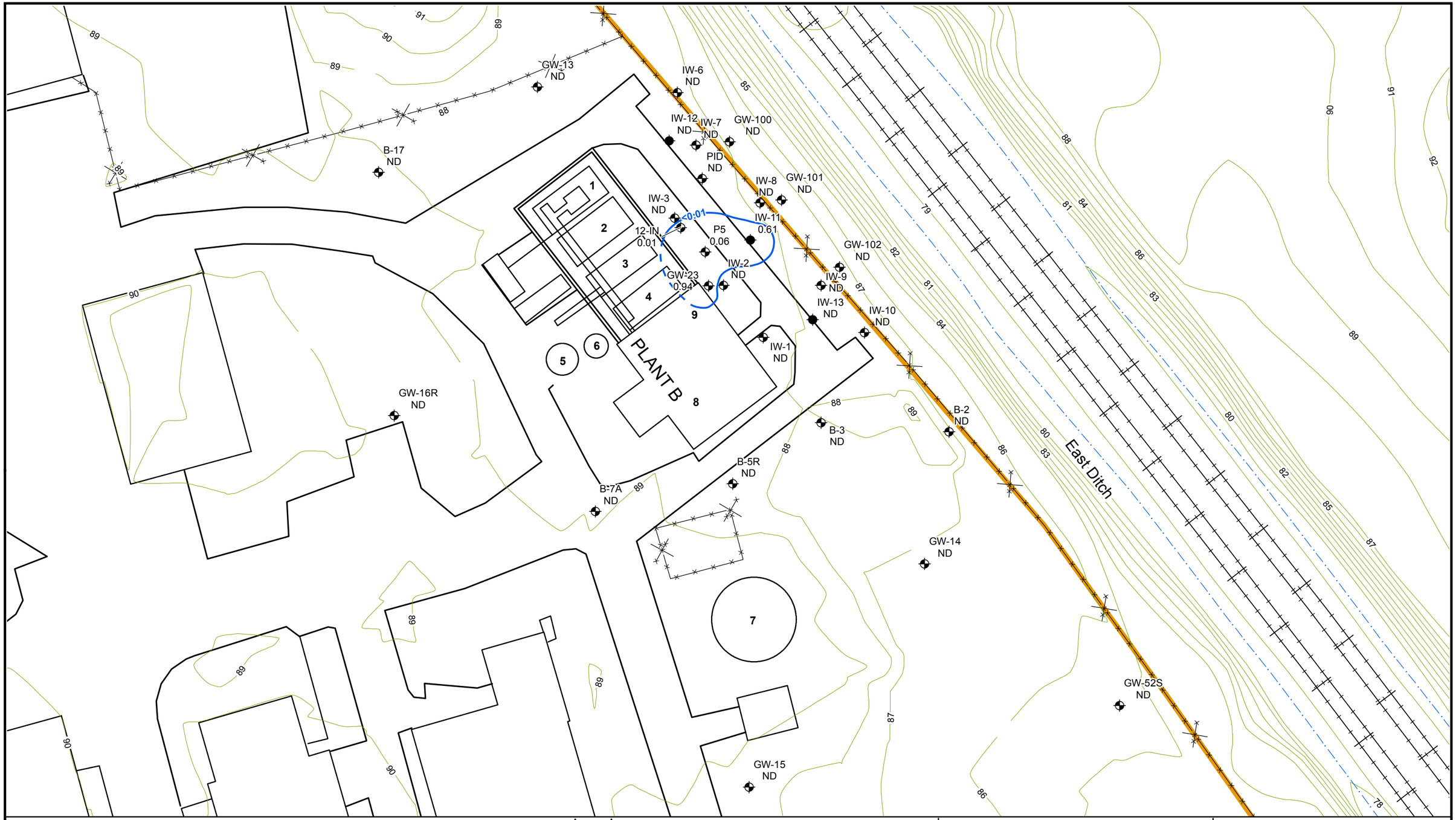

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

Type

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-9
Plant B Interpreted LNAPL Thickness Contours - June 29, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18

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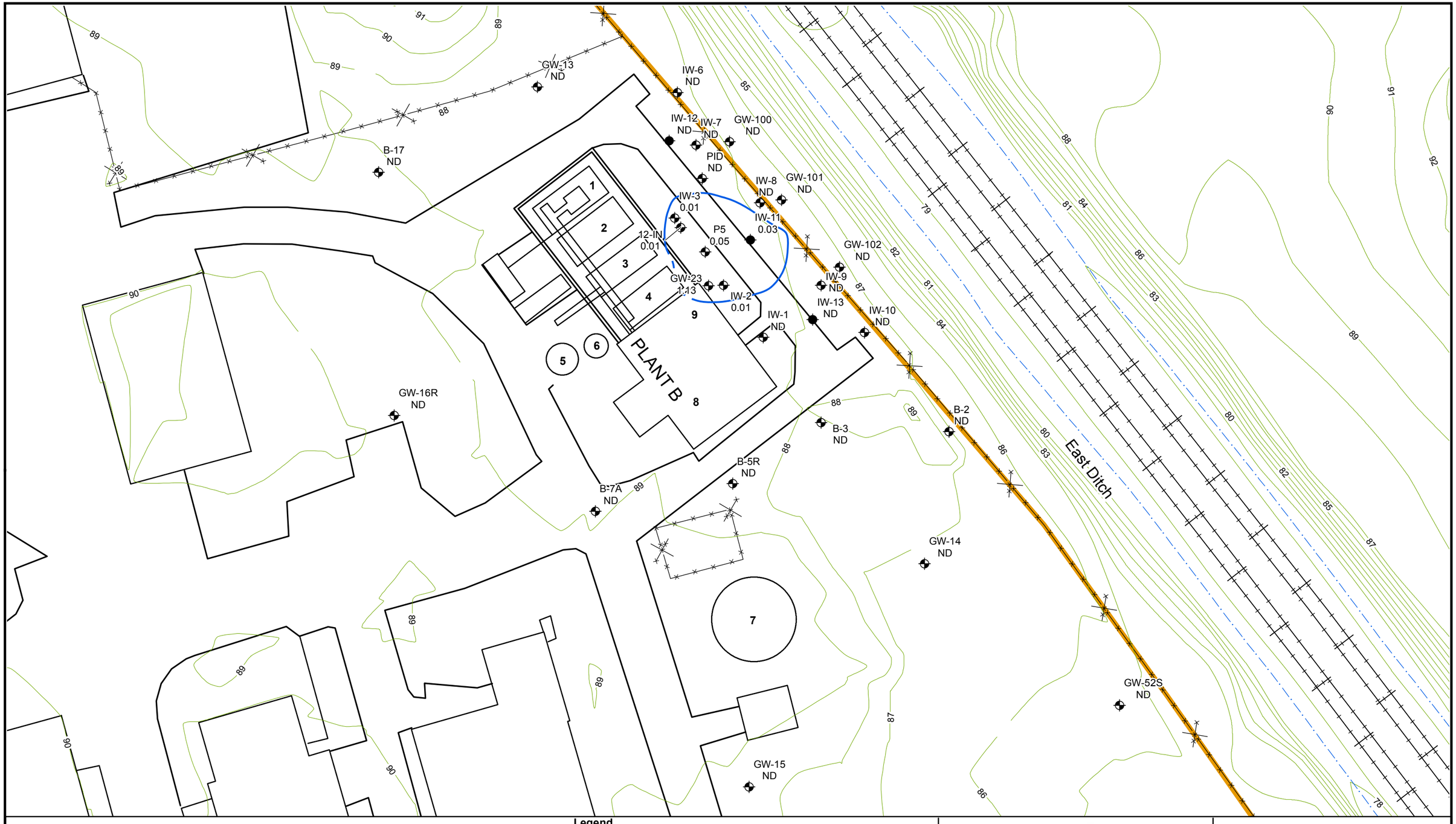

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

Type

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-10
Plant B Interpreted LNAPL Thickness Contours - July 26, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18

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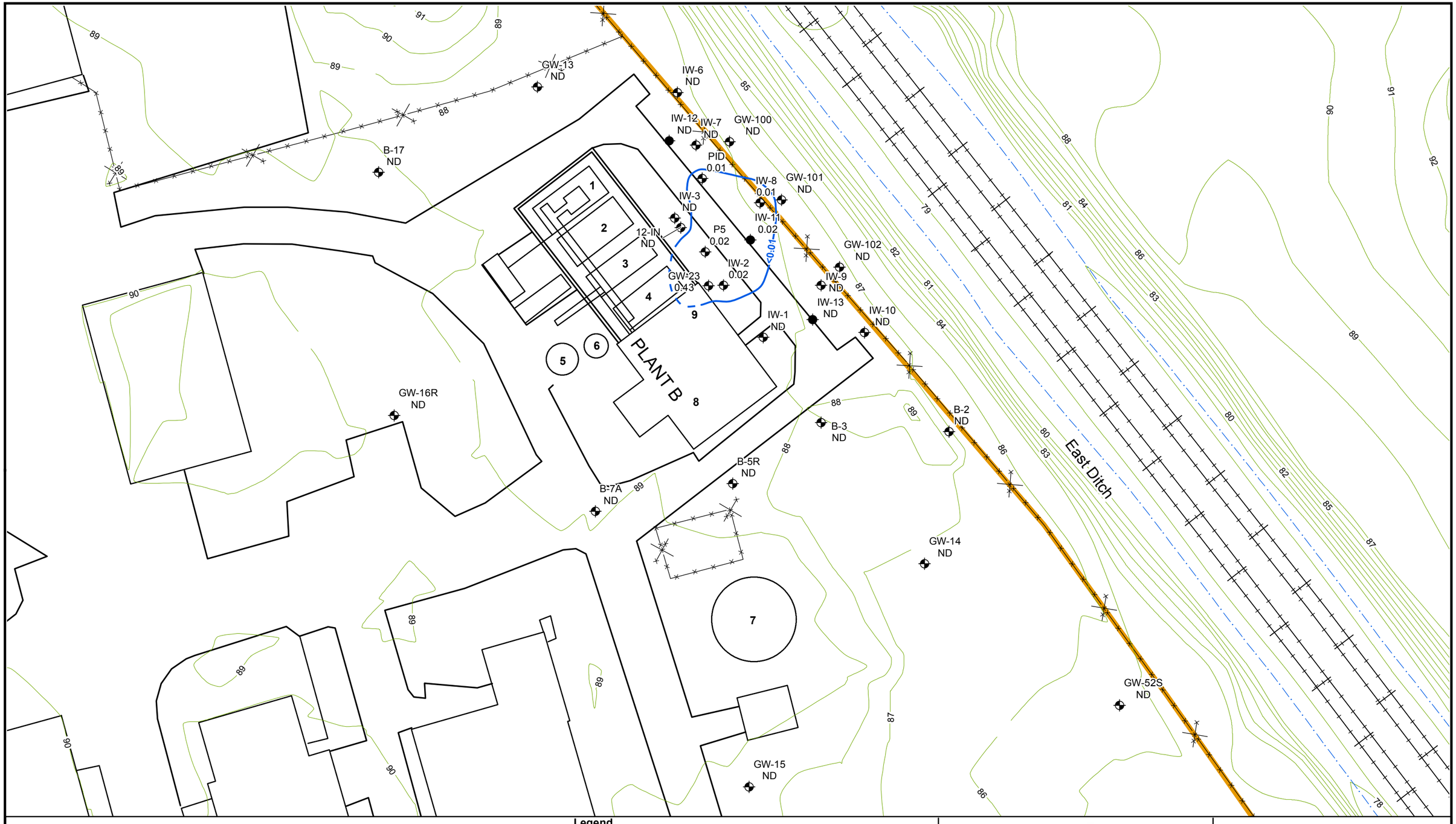

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

Type

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-11
Plant B Interpreted LNAPL Thickness Contours - August 31, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18

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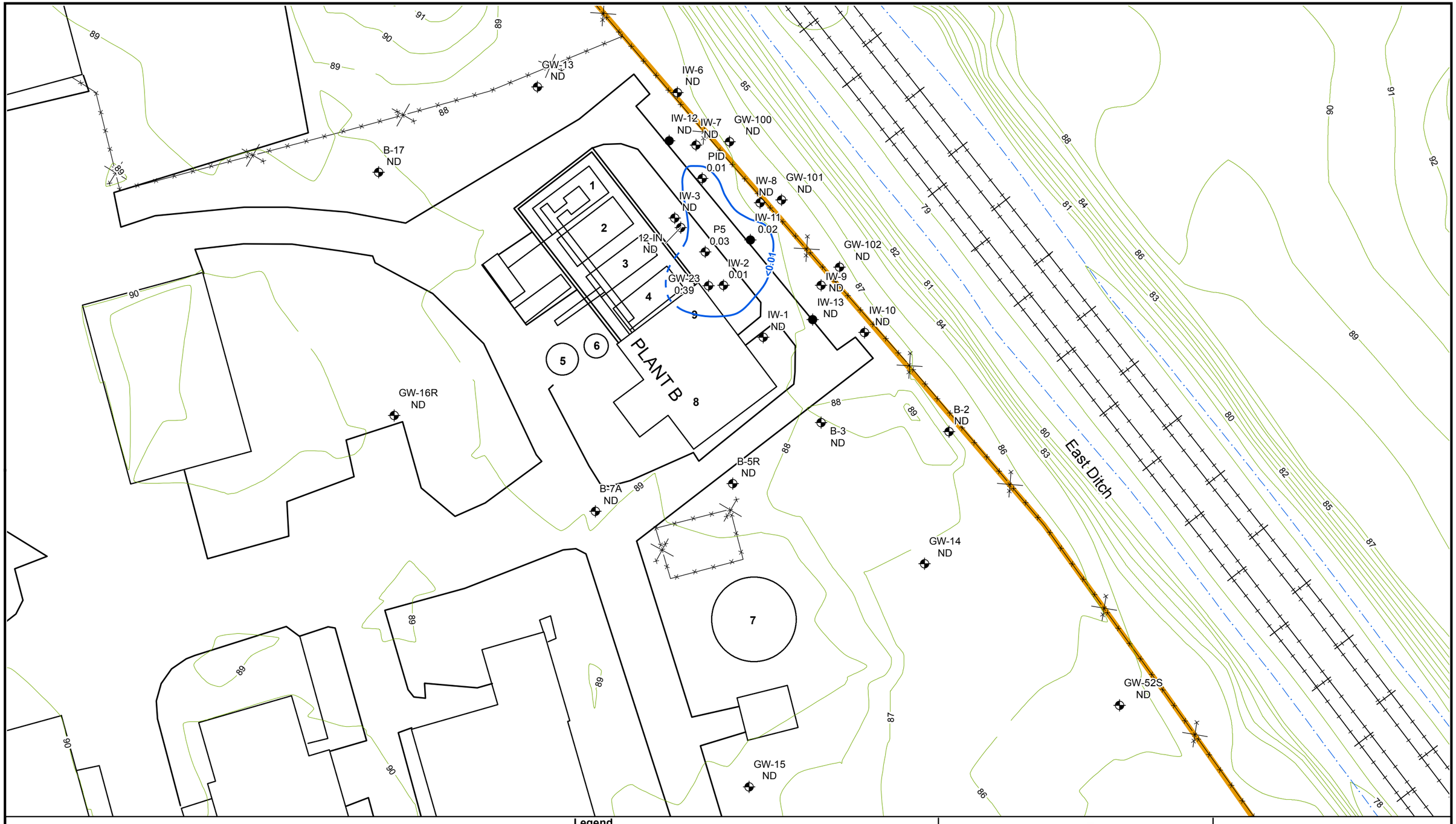

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

Type

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- Site Boundary
- Fence
- Railroad

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-12
Plant B Interpreted LNAPL Thickness Contours - October 1, 2018

Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 12/14/18 | Checked/Date: CTM 12/14/18

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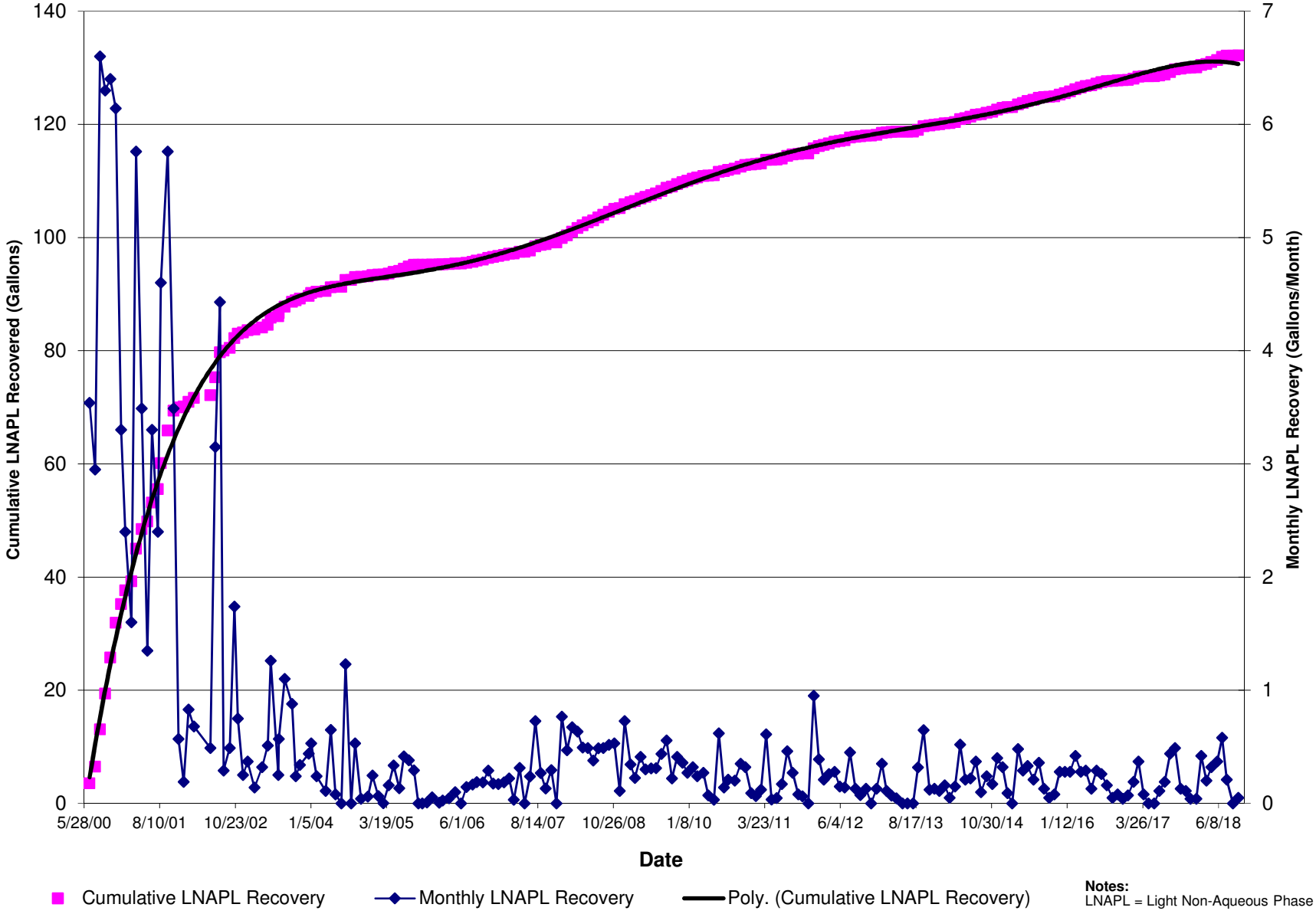
Figure 3-13
Monthly and Cumulative LNAPL Recovery
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts



Notes:
LNAPL = Light Non-Aqueous Phase Liquid

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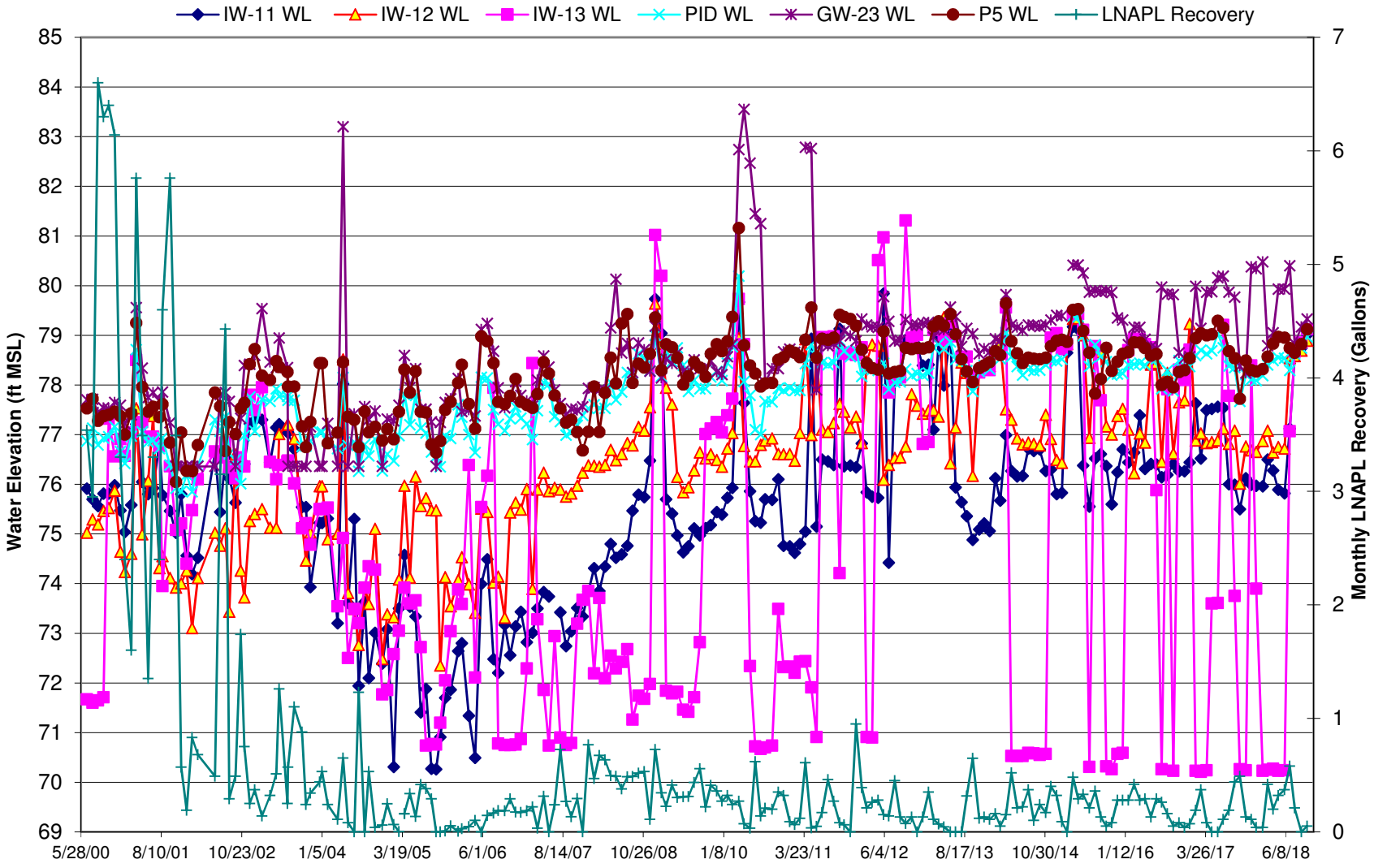
Monthy and Cumulative LNAPL Recovery Data Plot.xls, Figure 3-13

Prepared by / Date: SAI 10/26/2018
Checked by / Date: CTM 10/26/2018

Figure 3-14
Water Levels (WL) and Monthly LNAPL Recovery
Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts



Notes:
LNAPL = Light Non-Aqueous Phase Liquid

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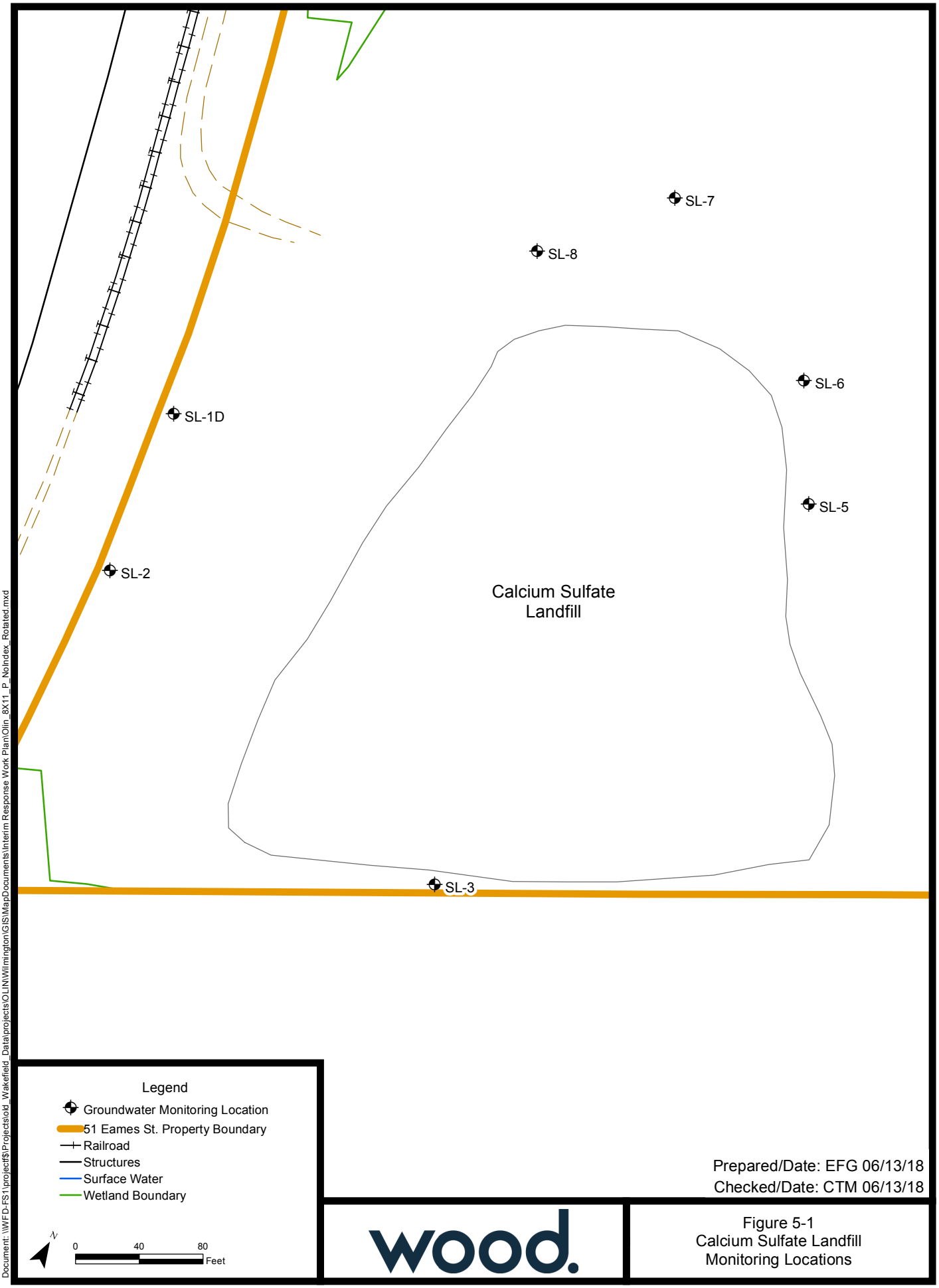
Monthy and Cumulative LNAPL Recovery Data Plot.xls, Figure 3-14

Prepared by / Date: SAI 10/26/2018
Checked by / Date: CTM 10/26/2018



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Prepared/Date: EFG 06/13/18
Checked/Date: CTM 06/13/18

wood.

Figure 5-1
Calcium Sulfate Landfill
Monitoring Locations

Appendix A

Interim Response Steps Field Activity Reports

Appendix A1

Second Quarter 2018 Sampling Event

Interim Response Steps Field Activity Report
Second Quarter 2018 Sampling Event

Olin Chemical Superfund Site
Wilmington, Massachusetts
Project 6107180016

Prepared for:

Olin Corporation
3855 North Ocoee St., Suite 200, Cleveland, TN 37312

3-Dec-18

Interim Response Steps Field Activity Report
Second Quarter 2018 Sampling Event

Olin Chemical Superfund Site
Wilmington, Massachusetts

Project 6107180016

Prepared for:
Olin Corporation
3855 North Ocoee St., Suite 200, Cleveland, TN 37312

Prepared by:
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090

3-Dec-18

Prepared and Reviewed by:

Peter H. Thompson
Project Manager

Michael J. Murphy
Project Principal

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Appendix A Field Data Records and Field Instrument Calibration Records
Appendix B Chain of Custody Records
Appendix C Cap Inspection Log

List of acronyms

Amec Foster Wheeler	Amec Foster Wheeler Environment and Infrastructure, Inc.
DO	Dissolved Oxygen
IRSWP	Interim Response Steps Work Plan
LNAPL	Light Non-Aqueous Phase Liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
NTU	Nephelometric Turbidity Units

ORP	Oxidation/Reduction Potential
RI/FS	Remedial Investigation/Feasibility Study
SC	Specific Conductivity
TAL	TestAmerica Laboratories, Inc.
USEPA	United States Environmental Protection Agency
UV	Ultraviolet

1.0 INTRODUCTION

On behalf of the Olin Corporation (Olin), Wood Environment & Infrastructure Solutions, Inc. (Wood E&IS) formerly Amec Foster Wheeler, presents this summary report for field activities completed in association with the Second Quarter 2018 groundwater and surface water monitoring for the Slurry Wall/Cap Monitoring Program and the Plant B Monitoring Program. These activities were conducted consistent with the requirements and procedures contained in the Final Interim Response Steps Work Plan (IRSWP), Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts dated August 8, 2008 and the Volume IIIB, the Quality Assurance Project Plan, of the Final Remedial Investigation/Feasibility Study (RI/FS) Work Plan dated August 14, 2009 (MACTEC Engineering and Consulting, Inc. [MACTEC], 2009).

1.1 Limitations

This report, including its findings, opinions, and conclusions, is intended for the exclusive use and benefit of, and may be relied upon only by Olin Corporation and the United States Environmental Protection Agency (USEPA).

2.0 Slurry Wall/Cap monitoring program

The purpose of the Slurry Wall/Cap Monitoring Program is to monitor the concentrations of select constituents in groundwater and surface water in areas adjacent to and within the South Ditch of the former Olin Facility located at 51 Eames Street, Wilmington, Massachusetts.

The Second Quarter 2018 groundwater and surface water monitoring program includes collecting groundwater level measurements from select monitoring wells and piezometers, collecting and analyzing groundwater samples from 15 monitoring wells and five piezometers, and collecting and analyzing surface water samples from seven locations within the East Ditch and South Ditch. Groundwater and surface water sample locations are listed in **Table 1** and shown on **Figure 1**. The groundwater and surface water sampling program is further described in the Final IRSWP (MACTEC, 2008), which has been approved by the USEPA.

2.1 Scope of Work

The Slurry Wall/Cap Monitoring Program for this sampling event consists of collecting groundwater level measurements in the vicinity of the South Ditch area; collecting and analyzing groundwater samples from the following monitoring wells: GW-10S, GW-24, GW-25, GW-34SR, GW-34D, GW-35S, MP-2 #13, GW-43SR, GW-76S, GW-78S, GW-79S, GW-201S, GW-202S, GW-202D, and GW-CA-1; and piezometers: PZ-16RRR, PZ-17RRR, PZ-18R, PZ-24, and PZ-25; collecting and analyzing surface water samples from the following locations: ISCO-1, ISCO-2, ISCO-3, SD-17, PZ-16RRR, PZ-17RRR, and PZ-18R; and downloading water level and barometric pressure data from data loggers that have been installed in the following wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, PZ-24, PZ-25, and GW-6S. Monitoring wells, piezometers, and surface water sample locations are shown on **Figure 1**.

2.1.1 Groundwater Level Measurement

On May 15 through 18, 2018, Olin personnel completed a site reconnaissance of the monitoring well locations in the Slurry Wall/Cap Monitoring Program and collected groundwater level measurements. This included measuring depth to groundwater from 22 monitoring wells and piezometers using a water level meter. Groundwater level measurements and calculated groundwater elevations are summarized in **Table 2**.

2.1.2 Groundwater Sampling

On May 15 through 18, 2018, Olin personnel sampled groundwater from 15 monitoring wells and five piezometers using 2010 USEPA low stress (low flow) groundwater sampling methods.

Prior to low flow sampling, a Horiba U-52 multi-parameter water quality meter and a Hach 2100Q turbidity meter were calibrated according to the instrument manufacturer's specifications using certified calibration solutions.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at each monitoring location. During sampling activities, the purged groundwater was continuously monitored using the multi-parameter water quality meter for pH, temperature, specific conductivity (SC), dissolved oxygen (DO), and oxidation/reduction potential (ORP), while turbidity was monitored using the Hach 2100Q turbidity meter. Well purging continued at each location until these field parameters stabilized as indicated in Appendix A of the IRSWP.

Monitoring wells GW-24, PZ-16RRR, and PZ-17RRR went dry upon purging and could not be sampled by low flow methods. These wells were purged dry and sampled upon recovery, which is the alternative approved method. Samples collected by this method typically have elevated turbidity. The final low flow

purging field parameter measurements are presented in **Table 3**. Field data records for each groundwater monitoring location are attached in **Appendix A**.

Upon stabilization of groundwater parameters, groundwater samples were collected by directly filling the laboratory prepared sample bottles. A 0.45-micron pore diameter, in-line Teflon™ filter was used to field filter groundwater for dissolved metal analysis in accordance with the IRSWP. The samples were placed on ice and transferred to TestAmerica Laboratories, Inc. (TAL) of Buffalo, New York, under chain-of-custody for chemical analyses as summarized in **Table 4**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data are presented in the January 2019 Semi-Annual Status Report.

Purged groundwater from each monitoring well was collected in collapsible plastic containers, transported to the Block House building, adjacent to the Plant B groundwater treatment building, and containerized in a secured 55-gallon drum. Olin characterizes and disposes of that material in accordance with applicable regulations.

2.1.3 Surface Water Sampling

On May 22, 2018, Olin personnel collected seven surface water samples from downstream to upstream from the East Ditch and South Ditch. The locations are identified as ISCO-3, ISCO-2, PZ-16RRR, PZ-17RRR, SD-17, PZ-18R, and ISCO-1 as shown on **Figure 1**.

Before field activities began, a Horiba U-52 multi-parameter water quality meter and Hach 2100Q turbidity meter were properly calibrated to monitor surface water quality parameters at each location.

At each of the seven field locations, surface water parameter measurements (pH, temperature, SC, ORP, DO, and turbidity) were collected. Readings were collected by directly submersing the Horiba probe into the surface water until parameter stabilization. The final surface water field parameters are summarized in **Table 5**. Field data records from each surface water sample location are attached in **Appendix A**.

Filtered surface water samples (for dissolved metals analysis) were collected by submerging dedicated tubing attached to a peristaltic pump into the water column at a depth that minimized entraining floating or suspended sediment. The peristaltic pump provides positive pressure for field filtering the water through the 0.45-micron pore diameter filter for dissolved metal analysis.

Surface water samples were collected by directly filling the laboratory prepared glassware. The samples were then placed on ice for delivery to TAL of Buffalo, New York, under chain-of-custody for chemical analyses summarized in **Table 6**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data are presented in the January 2019 Semi-Annual Status Report.

2.1.4 Data Logger Data Download

Data loggers are deployed in 10 monitoring wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, PZ-24, PZ-25, and GW-6S, to continuously monitor groundwater elevation proximate to the cap area. Wood E&IS downloaded data from the 10 data loggers, along with data from the barometric pressure data logger deployed in GW-35S. Downloaded data from the loggers are presented in the January 2019 Semi-Annual Status Report.

2.1.5 Cap Inspection

The temporary cap is composed of ten large and three small scrim reinforced polyethylene sheets of 8 mil thickness. These sheets were factory fabricated with double welded seams from smaller, narrower panels. The seams between the large sheets were field fabricated by folding and sewing the edges of the sheets together with an ultraviolet (UV)-resistant thread. The original temporary cap was installed in 2001 and

consisted of a 6-mil thick sheet. Due to deterioration of the 6-mil sheet, an 8-mil thick cover was installed directly over the 6-mil cover and re-ballasted with sand bags to resist wind uplift.

Since November 2016, Olin on-site personnel have been conducting the cap inspections and integrating the inspections with the maintenance repair activities. Olin has reduced the official inspection frequency from quarterly to semi-annually with informal inspections to continue to ensure that any potential significant issues are addressed in a timely fashion. The semi-annual cap inspection and maintenance field data record is included as **Appendix C** and is summarized in the January 2019 Semi-Annual Status Report (No. 23).

3.0 Plant B monitoring program

The purpose of the Plant B groundwater sampling and analysis program is to monitor groundwater quality at select monitoring wells and conduct gauging activities to determine groundwater elevations and light non-aqueous phase liquid (LNAPL) thickness.

3.1 Scope of Work

The Second Quarter 2018 Plant B Monitoring Program consisted of measuring groundwater levels in 28 monitoring wells within the Plant B area, gauging LNAPL thickness in monitoring wells where LNAPL was observed, and USEPA low stress (low flow) groundwater sampling at monitoring well: GW-16R. Groundwater monitoring wells from the Plant B Monitoring Program are shown on **Figure 2**.

3.1.1 Groundwater Level Measurements and LNAPL Gauging

On May 31, 2018, Olin personnel completed a site reconnaissance of the monitoring well locations in the Plant B Monitoring Program and collected groundwater level measurements and LNAPL thickness measurements. Depth to groundwater was measured in 28 monitoring wells using a water interface probe. For wells with observed LNAPL, LNAPL thickness was measured using an oil/water interface probe. Groundwater level measurements, groundwater elevations, and LNAPL thickness measurements are summarized in **Table 7**.

3.1.2 Groundwater Sampling

On May 21, 2018, Olin personnel sampled groundwater from monitoring well GW-16R following the 2010 USEPA low stress (low flow) groundwater sampling method.

Prior to low flow sampling, a Horiba U-52 multi-parameter water quality meter and Hach 2100Q turbidity meter were calibrated according to the instrument manufacturer's specifications using certified calibration solutions.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at the sample location. During sampling activities, the purged groundwater was continuously monitored using the Horiba U-52 multi-parameter water quality meter for pH, temperature, SC, DO, and ORP, while turbidity was monitored using the Hach 2100Q turbidity meter. Well purging continued at the sample location until these field parameters stabilized as indicated in Appendix A of the IRSWP. The final low flow purging field parameter measurements are presented in **Table 8**. Field data records for each groundwater monitoring location are attached in **Appendix A**.

Upon groundwater parameter stabilization, groundwater samples were collected by directly filling the laboratory prepared glassware. The samples were placed on ice, and were transferred to TAL of Buffalo, New York, under chain-of-custody for chemical analyses as summarized in **Table 9**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data will be presented in the January 2019 Semi-Annual Status Report.

Purged groundwater from sampling activities was collected in collapsible plastic containers, transported to the Block House building, adjacent to the Plant B groundwater treatment building, and containerized in a secured 55-gallon drum. Olin characterizes and disposes of that material in accordance with applicable regulations.

4.0 References

MACTEC Engineering and Consulting, Inc. (MACTEC), August 8, 2008. Final Interim Response Steps Work Plan, Olin Chemical Superfund Site, Wilmington, Massachusetts.

MACTEC, August 14, 2009. Final RI/FS Work Plan, Olin Chemical Superfund Site, Wilmington, Massachusetts.

Tables

Table 1
Groundwater and Surface Water Sampling Locations
Slurry Wall/Cap Monitoring Program
Second Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Groundwater	Surface Water
GW-10S	ISCO1
GW-24	ISCO2
GW-25	ISCO3
GW-26*	PZ-16RRR
GW-34SR	PZ-17RRR
GW-34D	**PZ-18R**
GW-35S	SD-17
GW-42S**	
GW-43SR	
GW-76S	
GW-78S	
GW-79S	
GW-201S	
GW-202S	
GW-202D	
GW-CA1	
PZ-16RRR #	
PZ-17RRR #	
PZ-18R	
PZ-24	
PZ-25	
GW-16R ^	

Notes:
Bold - DUP/ MS/ MSD collected
* - Well removed for detention basin construction
** - Well destroyed; Sampled MP-2 #13
# - Piezometer replaced in South Ditch
^ - Plant B Monitoring Well

Prepared by: CTM 7/23/2018
Checked by: SAI 7/23/2018

Table 2
Groundwater Elevations
Slurry Wall/Cap Monitoring Program
Second Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL ID	Reference Elevation	Depth to Water (1, 2)	Groundwater Elevation (3)	Notes	Date Measured
I.D.	(ft msl)	(ft)	(feet NGVD)		
GW-10S	89.79	8.32	81.47	TOC	5/18/2018
GW-24	83.43	2.12	81.31		5/18/2018
GW-25	85.97	4.80	81.17		5/16/2018
GW-26*	84.93	*	---	*	
GW-34D	90.36	7.45	82.91		5/17/2018
GW-34SR	89.13	6.14	82.99		5/17/2018
GW-35S	88.51	6.85	81.66		5/17/2018
GW-39^	83.64	7.24	76.40		5/18/2018
GW-42S**	84.18	**	---	**	
GW-43SR	87.86	6.27	81.59		5/18/2018
GW-55S	81.70	2.41	79.29		5/18/2018
GW-55D	81.95	2.61	79.34		5/18/2018
GW-76S	88.45	7.00	81.45	TOC	5/18/2018
GW-78S	84.89	4.21	80.68		5/16/2018
GW-79S	81.54	3.00	78.54		5/16/2018
GW-201S	83.29	3.68	79.61		5/18/2018
GW-202S	86.97	6.20	80.77		5/15/2018
GW-202D	86.52	5.57	80.95		5/15/2018
GW-CA1	88.01	6.42	81.59		5/17/2018
PZ-16RRR/IN	***	3.25	---		5/16/2018
PZ-16RRR/OUT (4)	***	NM	---	NM	
PZ-17RRR/IN	***	2.08	---		5/16/2018
PZ-17RRR/OUT (4)	***	NM	---	NM	
PZ-18R/IN	82.42	1.80	80.62		5/16/2018
PZ-18R/OUT (4)	82.42	NM	---	NM	
PZ-24	89.43	8.35	81.08		5/15/2018
PZ-25	88.90	8.06	80.84		5/15/2018

Notes:

Prepared by: CTM 7/23/2018
Checked by: SAI 7/23/2018

(1) - Measurement from top of PVC. If no PVC, measurement from TOC
(2) - Collected using a Solinst water interface probe
(3) - Groundwater Elevation = Reference Elevation - Depth to Water
(4) - Reported elevation of surface water adjacent to piezometer
TOC - Water level measurement taken from Top of Casing
* - Well removed for detention basin construction
** - Well destroyed during paving
*** - Piezometer replaced in South Ditch. Not surveyed
NGVD - National Geodetic Vertical Datum
msl - mean sea level
ft - feet
NM - not measured
^ - Well heaving

Table 3
Final Field Parameters for Groundwater Sampling
Slurry Wall/Cap Monitoring Program
Second Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Slurry Wall/Cap Monitoring Well Samples						**Quarterly Slurry Wall/Cap Piezometer Samples**				
Location ID	GW-25	GW-78S	GW-79S	GW-202S	GW-202D	PZ-16RRR	PZ-17RRR	PZ-18R	PZ-24	PZ-25
Date	5/16/2018	5/16/2018	5/16/2018	5/15/2018	5/15/2018	5/16/2018	5/16/2018	5/16/2018	5/15/2018	5/15/2018
Depth to Water (ft)	5.26	4.37	3.00	6.23	5.65	Dry	Dry	2.79	8.49	8.13
Temperature (°C)	11.53	11.89	12.20	12.87	13.90	14.75	15.55	13.53	14.41	13.50
Specific Conductivity (mS/cm)	0.926	1.07	1.56	0.764	2.40	1.16	0.692	4.94	1.46	1.19
pH (standard units)	11.15	10.10	8.65	8.00	6.26	9.65	11.04	9.97	9.18	8.84
Dissolved Oxygen (mg/L)	1.69	0.01	1.77	0.01	2.30	8.00	4.25	0.44	0.23	2.06
Turbidity (NTU)	0.01	0.01	31.2	1.5	10.7	164	139	17.9	28.1	4.7
ORP (millivolts)	-115	-3	12	126	232	-50	-160	-81	-51	28

Semiannual Slurry Wall/Cap Monitoring Well Samples										
Location ID	GW-10S	GW-24	GW-34SR	GW-34D	GW-35S	MP-2#13	GW-43SR	GW-76S	GW-201S	GW-CA-1
Date	5/18/2018	5/18/2018	5/17/2018	5/17/2018	5/17/2018	5/18/2018	5/18/2018	5/18/2018	5/18/2018	5/17/2018
Depth to Water (ft)	8.40	Dry	6.14	7.45	6.98	Multi-port	6.27	7.02	3.93	6.42
Temperature (°C)	11.10	10.36	15.17	16.25	13.36	12.76	14.45	12.01	13.45	12.69
Specific Conductivity (mS/cm)	0.122	0.473	0.048	0.083	0.958	1.51	0.843	0.219	2.62	0.384
pH (standard units)	6.89	7.89	7.24	7.30	10.94	6.44	6.41	7.60	7.64	8.00
Dissolved Oxygen (mg/L)	3.87	0.46	6.04	0.38	5.95	8.91	7.41	6.39	0.01	3.91
Turbidity (NTU)	4.5	15.1	0.01	0.01	2.9	0.1	17.6	26.6	81	0.01
ORP (millivolts)	249	33	154	101	-100	147	220	125	85	59

Notes:
ft - feet
mS/cm - milliSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts
Dry = purged dry and sampled upon recovery

Prepared by: CTM 7/23/2018
Checked by: SAI 7/23/2018

Table 4
Groundwater Laboratory Analytical Program
Slurry Wall/Cap Monitoring Program
Second Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
Chloride	EPA 300.0	0.28	mg/L
Specific Conductivity	SM18 2510B	1.0	µmhos/cm
Sulfate	EPA 300.0	0.35	mg/L
Filtered Metals			
Aluminum, filtered	SW846 6010B	60	µg/L
Chromium, filtered	SW846 6010B	1.0	µg/L

Notes:
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µmhos/cm = µS/cm (microSiemens per centimeter)
1 µS/cm = 0.001 mS/cm (milliSiemens per centimeter)
µg/L - micrograms per liter

Prepared by: CTM 7/23/2018
Checked by: SAI 7/23/2018

Table 5
Final Field Parameters for Surface Water Sampling
Slurry Wall/Cap Monitoring Program
Second Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Surface Water Samples							
Location ID	ISCO1	ISCO2	ISCO3	PZ-16RRR	PZ-17RRR	PZ-18R	SD-17
Date	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/22/2018
Sample Depth of Water (ft)	0.50	0.17	0.17	0.17	0.17	0.33	0.25
Temperature (° C)	14.51	18.12	20.39	17.07	17.30	14.99	15.41
Specific Conductivity (mS/cm)	0.829	0.822	0.342	0.913	0.506	0.829	0.985
pH (standard units)	9.04	7.09	5.81	7.85	9.03	9.01	8.83
Dissolved Oxygen (mg/L)	2.27	5.41	8.78	9.68	7.08	4.11	10.55
Turbidity (NTU)	0.01	88.1	13.2	3.8	14.0	8.2	1.71
ORP (millivolts)	81	108	98	107	83	79	78

Notes:
ft - feet
mS/cm - milliSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts

Prepared by: CTM 7/23/2018
Checked by: SAI 7/23/2018

Table 6
Surface Water Analytical Program
Slurry Wall/Cap Monitoring Program
Second Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.1	mg/L
Nitrate	EPA 300.0	0.02	mg/L
Nitrite	EPA 300.0	0.02	mg/L
Chloride	EPA 300.0	0.28	mg/L
Specific Conductivity	SM18 2510B	1.0	µmhos/cm
Sulfate	EPA 300.0	0.34	mg/L
Total Metals			
Aluminum, Total	SW846 6010B	60	µg/L
Chromium, Total	SW846 6010B	1.0	µg/L
Sodium, Total	SW846 6010B	320	µg/L
Filtered Metals			
Aluminum, Filtered	SW846 6010B	60	µg/L
Chromium, Filtered	SW846 6010B	1.0	µg/L
Sodium, Filtered	SW846 6010B	320	µg/L

Notes:
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µmhos/cm = µS/cm (microSiemens per centimeter)
1 µS/cm = 0.001 mS/cm (milliSiemens per centimeter)
µg/L - micrograms per liter

Prepared by: CTM 7/23/2018
Checked by: SAI 7/23/2018

Table 7
Groundwater Elevations
Plant B Monitoring Program
Second Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL ID	Reference Elevation (1)	Depth to Water (2)	Depth to Product (3)	Product Thickness (4)	Groundwater Elevation (5)	Date Measured
I.D.	(ft msl)	(ft)	(ft)	(ft)	(feet NGVD)	
B-2	90.48	11.48	NPD	NA	79.00	5/31/2018
B-3	90.32	10.86	NPD	NA	79.46	5/31/2018
B-5R	91.38	10.82	NPD	NA	80.56	5/31/2018
B-7A	88.81	7.07	NPD	NA	81.74	5/31/2018
B-17	91.55	8.24	NPD	NA	83.31	5/31/2018
GW-13	90.57	11.14	NPD	NA	79.43	5/31/2018
GW-14	88.70	8.44	NPD	NA	80.26	5/31/2018
GW-15	90.01	7.40	NPD	NA	82.61	5/31/2018
GW-16R	92.46	9.71	NPD	NA	82.75	5/31/2018
GW-23	91.04	11.84	11.07	0.77	79.93	5/31/2018
GW-52S	87.95	7.64	NPD	NA	80.31	5/31/2018
GW-100	90.15	11.53	NPD	NA	78.62	5/31/2018
GW-101	90.14	11.50	NPD	NA	78.64	5/31/2018
GW-102	89.00	10.29	NPD	NA	78.71	5/31/2018
IW-1	90.71	11.41	NPD	NA	79.30	5/31/2018
IW-2	90.53	11.53	NPD	NA	79.00	5/31/2018
IW-3	90.76	11.66	NPD	NA	79.10	5/31/2018
IW-6	89.15	10.74	NPD	NA	78.41	5/31/2018
IW-7	90.10	11.66	NPD	NA	78.44	5/31/2018
IW-8	89.94	11.39	NPD	NA	78.55	5/31/2018
IW-9	89.78	11.05	NPD	NA	78.73	5/31/2018
IW-10	90.43	11.54	NPD	NA	78.89	5/31/2018
IW-11	89.92	14.47	14.08	0.39	75.82	5/31/2018
IW-12	90.31	13.59	NPD	NA	76.72	5/31/2018
IW-13	89.90	19.66	NPD	NA	70.24	5/31/2018
PID	89.97	11.43	NPD	NA	78.54	5/31/2018
P5	90.45	11.54	11.50	0.04	78.95	5/31/2018
12-IN	89.84	10.77	NPD	NA	79.07	5/31/2018

Notes:

Prepared by: CTM 7/23/2018

Checked by: SAI 7/23/2018

(1) - Reference elevations surveyed 11/97. New TOC survey by Dana Perkins 4-5/98

(2) - Top of PVC. If no PVC, measurement from top of steel casing

(3) - Collected using a Solinst water interface probe or Geotech oil/water interface probe

(4) - If sheen is noted, a product thickness of 0.01 feet will be used to calculate the groundwater elevation

(5) - Groundwater Elevation = Reference Elevation - (Depth to Water - (Product Thickness x 0.95))

TOC - Top of Casing

NPD - No Product Detected

NA - Not Applicable

NGVD - National Geodetic Vertical Datum

msl - mean sea level

ft - feet

East Ditch - No sheen noted; Observed OK

Table 8
Final Field Parameters for Groundwater Sampling
Plant B Monitoring Program
Second Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Plant B Monitoring Well Samples	
Location	GW-16R
Date	5/21/2018
Depth to Water (ft)	11.14
Temperature (° C)	15.71
Specific Conductivity (mS/cm)	0.164
pH (standard units)	9.37
Dissolved oxygen (mg/L)	0.01
Turbidity (NTU)	228
Oxidation Reduction Potential (mV)	-4

Notes:
ft - feet
mS/cm - milliSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts

Prepared by: CTM 7/23/2018
Checked by: SAI 7/23/2018

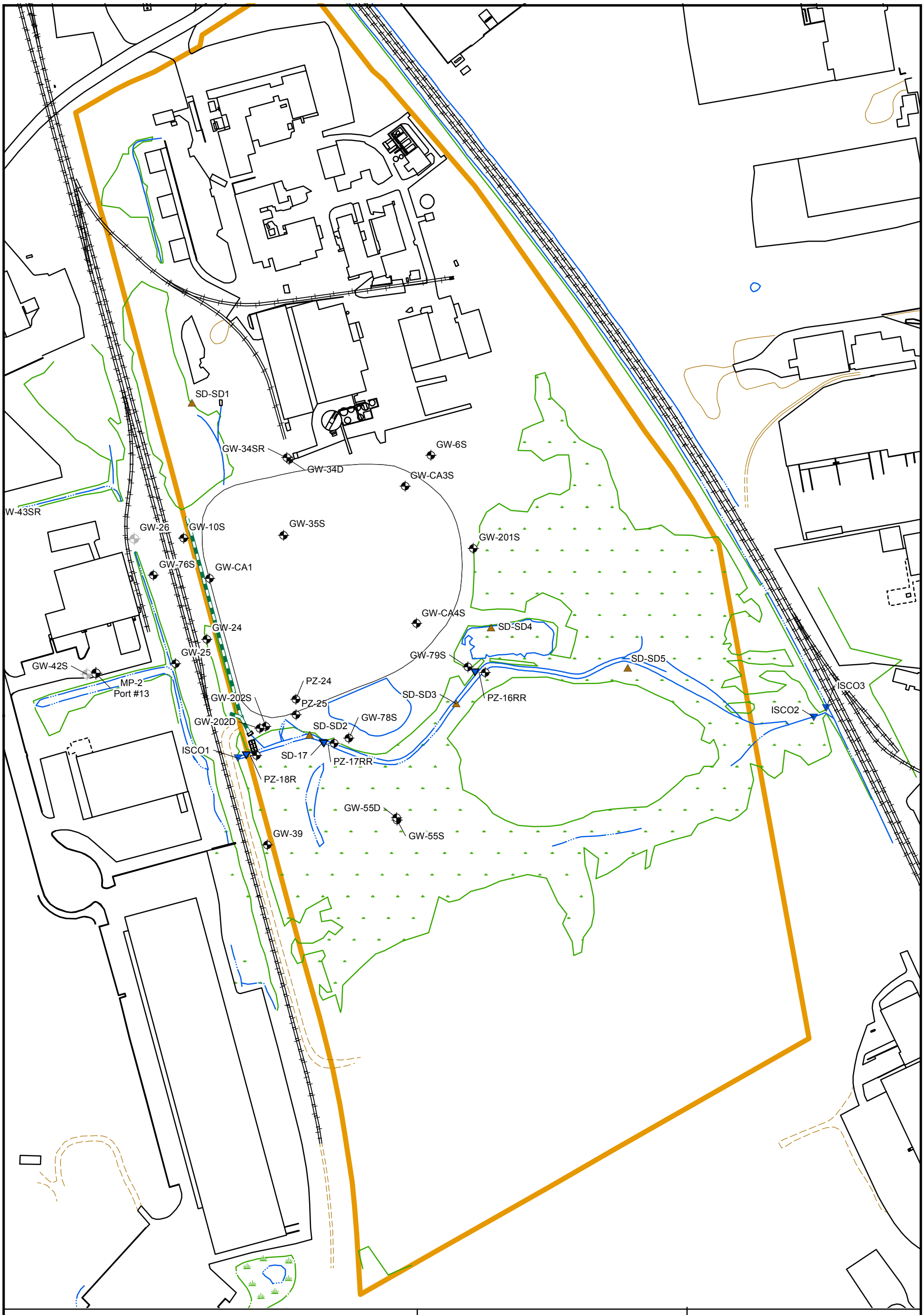
Table 9
Groundwater Laboratory Analytical Program
Plant B Monitoring Program
Second Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Volatile organic compounds (VOC)			
2,4,4-Trimethyl-1-pentene	SW846 8260B	0.40	µg/L
2,4,4-Trimethyl-2-pentene	SW846 8260B	0.43	µg/L
Semivolatile organic compounds (SVOC)			
N-nitrosodiphenylamine	SW846 8270C	0.07	µg/L
bis(2-ethylhexyl)phthalate	SW846 8270C	0.44	µg/L
Volatile Petroleum Hydrocarbons (VPH)			
C5-C8 Aliphatics	MA VPH	1.5	µg/L
C5-C8 Aliphatics, Unadjusted	MA VPH	1.5	µg/L
C9-C12 Aliphatics	MA VPH	1.5	µg/L
C9-C12 Aliphatics, Unadjusted	MA VPH	1.5	µg/L
C9-C10 Aromatics	MA VPH	0.50	µg/L
Methyl-tert-butyl-ether (MTBE)	MA VPH	0.25	µg/L
Benzene	MA VPH	0.25	µg/L
Ethylbenzene	MA VPH	0.25	µg/L
m,p-Xylene	MA VPH	0.50	µg/L
o-Xylene	MA VPH	0.25	µg/L
Toluene	MA VPH	0.25	µg/L
Naphthalene	MA VPH	0.25	µg/L
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
pH	SM 4500 H+ B	0.10	SU
Filtered Metals			
Iron, Filtered	SW846 6010B	19	µg/L

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
SU - standard units

Prepared by: CTM 7/23/2018
Checked by: SAI 7/23/2018

Figures



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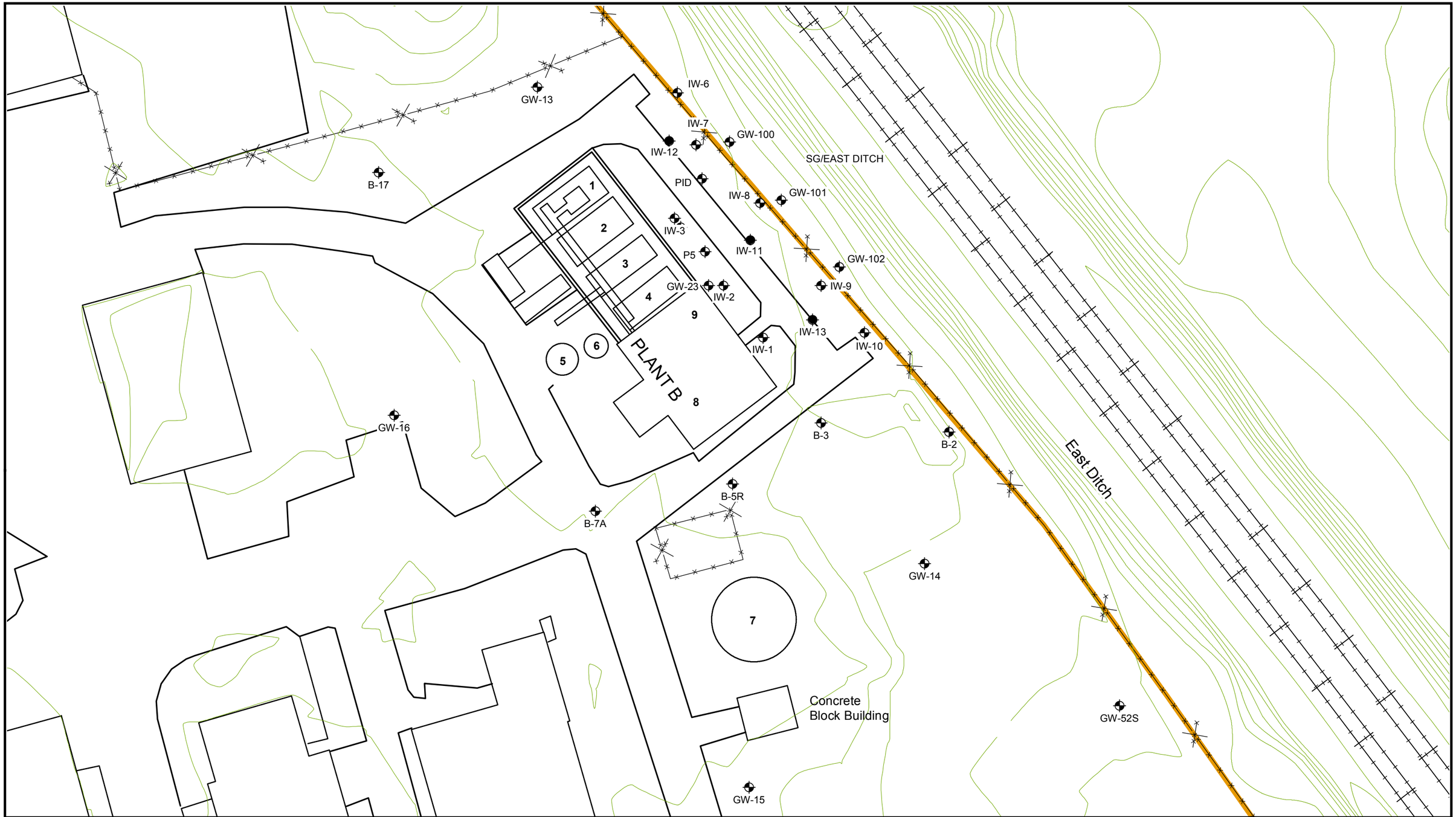

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Monitoring Well
- Recovery Well
- Elevation Contours

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Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 2
Plant B Monitoring Program
Sampling Locations

Interim Response Steps Field Activity Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/07/18 | Checked/Date: CTM 06/07/18

Document: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\Figures\Figure 3 - Plant B Monitoring Program Sampling Locations.pdf

Appendix A

Field Data Records and Field Instrument Calibration Records

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME: Olin Chemical Superfund Site - 2nd Quarter Sampling
PROJECT NUMBER: 6107180016
PROJECT LOCATION: 51 Eames St, Wilmington, MA
WEATHER CONDITIONS (AM):
WEATHER CONDITIONS (PM):

TASK NO: DATE: 5/15/2018
AMEC CREW: Olin - BEG
SAMPLER NAME: Brian Guichard
SAMPLER SIGNATURE: Field Form w/ Signature on File
CHECKED BY: CTM DATE: 7/25/2018

MULTI-PARAMETER WATER QUALITY METER

METER TYPE: Horiba
MODEL NO.: U-52
UNIT ID NO.: Olin

AM CALIBRATION — Start Time: End Time:

PM CALIBRATION CHECK — Start Time: End Time:

	Units	Standard Value	Meter Value	*Acceptance Criteria (AM)	Standard Value	Meter Value	*Acceptance Criteria (PM)
pH (4)	SU	4.0	4.01	+/- 0.1 pH Units			
pH (7)	SU	7.0	-	+/- 0.1 pH Units	4.0	4.02	+/- 0.3 pH Units
pH (10)	SU	10.0	-	+/- 0.1 pH Units			
Redox	+/- mV		294	+/- 10 mV		291	+/- 10 mV
Conductivity	mS/cm	4.49	4.52	+/- 3% of standard	4.49	4.48	+/- 5% of standard
DO (saturated)	%		-	+/- 2% of standard			
DO (saturated)	mg/L[1] (see Chart 1)	-	8.94	+/- 0.2 mg/L	-	9.45	+/- 0.5 mg/L of standard
DO (<0.1)	mg/L	<0.1	-	< 0.5 mg/L			
Temperature	°C		22.84			19.66	
Baro. Press.	mmHg		-			-	

TURBIDITY METER

METER TYPE: Hach
MODEL NO.: 2100Q
UNIT ID NO.: Olin

	Units	Standard Value	Meter Value	Standard Value	Meter Value	*Acceptance Criteria (PM)
Standard	NTU	10	10.0	10	10.1	+/- 5% of standard
Standard	NTU	20	20.0	20	20.0	
Standard	NTU	100	101	100	101	
Standard	NTU	800	797	800	803	

PHOTOIONIZATION DETECTOR

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Methane	%	50		50	+/- 10% of standard
O_2	%	20.9		20.9	+/- 10% of standard
H_2S	ppmv	25		25	+/- 10% of standard
CO	ppmv	50		50	+/- 10% of standard

OTHER METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

See Notes Below for Additional Information

[X] Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above **(see notes)**.
[ ] Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source:
Lot#/Date Produced:
Trip Blank Source: Lab
Sample Preservatives Source: Lab
Disposable Filter Type: Pine 0.45µm
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L)
- Other
- Other
- Other

	Cal. Standard Lot Number	Exp. Date
pH (4)	Horiba Auto-Cal Solution	Horiba Auto-Cal Solution
pH (7)	--	--
pH (10)	--	--
ORP	--	--
Conductivity	--	--
10 Turb. Stan.	Olin Cal Set	Olin Cal Set
20 Turb. Stan.	"	"
100 Turb. Stan.	"	"
800 Turb. Stan.	"	"
PID Span Gas		
O_2-LEL Span Gas		
DO		

NOTES:

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* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-Field Calibration) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additional acceptance criteria obtained from instrument specific manufacturer recommendations.
** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.
1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-Field Calibration), dated 1/19/2010.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-10S	ROUND NO.	2
SAMPLE ID	OC-GW-10S	SITE TYPE	Superfund	DATE	5/18/2018
TIME	START 9:30 END 10:05	JOB NUMBER	6107180016	BOTTLE TIME	9:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [ ] TOP OF WELL RISER
- [X] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 8.32 FT.

WELL DEPTH (TOR): 9.12 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 8.40 FT.

SCREEN LENGTH: N/A FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.17 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:35	8.40	180	12.12	0.160	7.01	7.00	15.8	208	~ 9 ft.	
9:40	8.40	180	11.90	0.133	6.84	4.11	7.2	235		
9:45	8.40	180	11.19	0.122	6.84	3.90	4.9	245		
9:50	8.40	180	11.11	0.121	6.88	3.85	4.7	249		
9:55	8.40	180	11.10	0.122	6.89	3.87	4.5	249		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.17 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

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WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-24	ROUND NO.	2
SAMPLE ID	OC-GW-24	SITE TYPE	Superfund	DATE	5/18/2018
TIME	START 10:50 END 11:15	JOB NUMBER	6107180016	BOTTLE TIME	11:05

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.12 FT.

WELL DEPTH (TOR): ~ 11.9 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: N/A FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.89 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

N/A

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:55	---	---	10.36	0.473	7.89	0.46	15.1	33	~ 11 ft.	
	Purge Well Dry		Sample Recharge							
11:05	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.89 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Well went dry; sample recharge

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-25	ROUND NO.	2
SAMPLE ID	OC-GW-25	SITE TYPE	Superfund	DATE	5/16/2018
TIME	START 7:35 END 8:27	JOB NUMBER	6107180016	BOTTLE TIME	8:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 4.80 FT.

WELL DEPTH (TOR): ~ 12.35 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 5.26 FT.

SCREEN LENGTH: N/A FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.04 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.46 GAL.

0.03
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
7:40	5.11	140	14.06	0.943	7.67	2.46	0.01	56	~ 11 ft.	
7:45	5.23	140	12.78	0.972	9.43	1.29	0.01	-93		
7:50	5.24	140	12.42	0.961	9.85	1.50	0.01	-113		
7:55	5.26	140	11.94	0.943	10.53	1.79	0.01	-129		
8:00	5.26	140	11.77	0.932	10.99	1.81	0.01	-129		
8:05	5.26	140	11.69	0.927	11.22	1.74	0.01	-124		
8:10	5.26	140	11.56	0.926	11.19	1.69	0.01	-118		
8:15	5.26	140	11.53	0.926	11.15	1.69	0.01	-115		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 125 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 125 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 125 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 250 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.46 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

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WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-34SR	ROUND NO.	2
SAMPLE ID	OC-GW-34SR	SITE TYPE	Superfund	DATE	5/17/2018
TIME	START 10:05 END 10:40	JOB NUMBER	6107180016	BOTTLE TIME	10:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.14 FT.

WELL DEPTH (TOR): ~ 17.04 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.14 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.17 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:10	6.14	180	15.81	0.050	7.47	9.91	0.01	127	~ 15 ft.	
10:15	6.14	180	16.16	0.049	7.45	6.90	0.01	149		
10:20	6.14	180	15.42	0.049	7.31	6.15	0.01	155		
10:25	6.14	180	15.29	0.048	7.25	6.10	0.01	154		
10:30	6.14	180	15.17	0.048	7.24	6.04	0.01	154		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 500 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.17 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-34D	ROUND NO.	2
SAMPLE ID	OC-GW-34D	SITE TYPE	Superfund	DATE	5/17/2018
TIME	START 9:15 END 10:05	JOB NUMBER	6107180016	BOTTLE TIME	9:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: DUP/MS/MSD

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER	7.45 FT.	WELL DEPTH (TOR)	~ 35.75 FT.	PID AMBIENT AIR	N/A PPM
FINAL DEPTH TO WATER	7.45 FT.	SCREEN LENGTH	10 FT.	PID WELL MOUTH	N/A PPM
DRAWDOWN VOLUME (final - initial x 0.16 {2-inch} or x 0.65 {4-inch})	<0.01 GAL.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED		PRESSURE TO PUMP	N/A PSI
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	1.25 GAL.	<0.01		REFILL TIMER SETTING	N/A SEC.

WELL DIAMETER: 2 IN.

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED		X	
COLLAR	X		

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:20	7.45	160	17.31	0.087	7.74	1.44	0.01	-12	~ 32 ft.	
9:25	7.45	160	17.06	0.082	7.25	0.49	0.01	63		
9:30	7.45	160	16.80	0.082	7.18	0.32	0.01	88		
9:35	7.45	160	16.27	0.083	7.23	0.35	0.01	96		
9:40	7.45	160	16.26	0.083	7.29	0.37	0.01	98		
9:45	7.45	160	16.25	0.083	7.30	0.38	0.01	101		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.25 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Collected DUP/MS/MSD

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

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WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-35S	ROUND NO.	2
SAMPLE ID	OC-GW-35S	SITE TYPE	Superfund	DATE	5/17/2018
TIME	START 8:30 END 9:05	JOB NUMBER	6107180016	BOTTLE TIME	8:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.85 FT.

WELL DEPTH (TOR): ~ 19.51 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.98 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.02 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.02

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.98 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:35	6.98	150	13.08	1.01	10.65	10.96	15.4	-67	~ 17 ft.	
8:40	6.98	150	13.22	0.994	10.86	7.50	9.7	-84		
8:45	6.98	150	13.34	0.965	10.93	6.02	4.9	-92		
8:50	6.98	150	13.35	0.960	10.94	5.97	3.6	-97		
8:55	6.98	150	13.36	0.958	10.94	5.95	2.9	-100		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.98 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-43SR	ROUND NO.	2
SAMPLE ID	OC-GW-43SR	SITE TYPE	Superfund	DATE	5/18/2018
TIME	START 7:20 END 8:05	JOB NUMBER	6107180016	BOTTLE TIME	7:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.27 FT.

WELL DEPTH (TOR): ~ 17.4 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.27 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.73 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
7:25	6.27	190	17.21	0.837	5.46	11.02	11.1	270	~ 16 ft.	
7:30	6.27	190	16.86	0.833	5.40	9.69	12.6	260		
7:35	6.27	190	15.53	0.830	5.71	8.49	17.4	227		
7:40	6.27	190	15.10	0.830	5.98	8.15	17.2	221		
7:45	6.27	190	14.58	0.840	6.37	7.51	17.8	220		
7:50	6.27	190	14.50	0.842	6.39	7.43	18.1	220		
7:55	6.27	190	14.45	0.843	6.41	7.41	17.6	220		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.73 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-76S	ROUND NO.	2
SAMPLE ID	OC-GW-76S	SITE TYPE	Superfund	DATE	5/18/2018
TIME	START 10:10 END 10:40	JOB NUMBER	6107180016	BOTTLE TIME	10:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 7.00 FT.

WELL DEPTH (TOR): ~ 15.1 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 7.02 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.91 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:15	7.02	175	12.60	0.241	7.89	7.37	106	149	~ 12 ft.	
10:20	7.02	175	12.24	0.229	7.85	7.27	116	133		
11:20	7.02	175	11.90	0.220	7.60	6.50	27.1	130		
10:25	7.02	175	12.05	0.220	7.60	6.41	29.2	128		
10:30	7.02	175	12.01	0.219	7.60	6.39	26.6	125		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.91 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-78S	ROUND NO.	2
SAMPLE ID	OC-GW-78S	SITE TYPE	Superfund	DATE	5/16/2018
TIME	START 9:40 END 10:18	JOB NUMBER	6107180016	BOTTLE TIME	10:10

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 4.21 FT.

WELL DEPTH (TOR): ~ 10.35 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.37 FT.

SCREEN LENGTH: 9 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.02 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.33 GAL.

0.02

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:45	4.36	170	14.17	1.23	9.12	1.69	10.2	-46	~ 9 ft.	
9:50	4.37	170	13.45	1.20	8.99	0.49	1.7	-36		
9:55	4.37	170	12.54	1.06	10.31	0.46	0.01	-17		
10:00	4.37	170	12.07	1.08	10.16	0.17	0.01	-7		
10:05	4.37	170	11.94	1.07	10.12	0.01	0.01	-5		
10:10	4.37	170	11.89	1.07	10.10	0.01	0.01	-3		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.33 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-79S	ROUND NO.	2
SAMPLE ID	OC-GW-79S	SITE TYPE	Superfund	DATE	5/16/2018
TIME	START 10:50 END 11:28	JOB NUMBER	6107180016	BOTTLE TIME	11:20

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.00 FT.

WELL DEPTH (TOR): ~ 11.25 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.00 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.25 GAL.

<0.01

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:55	3.00	160	14.34	1.50	8.67	3.78	34.7	-137	~ 9 ft.	
11:00	3.00	160	13.63	1.58	8.75	4.04	29.9	14		
11:05	3.00	160	13.41	1.58	8.69	3.85	27.1	15		
11:10	3.00	160	12.27	1.55	8.66	1.73	29.3	13		
11:15	3.00	160	12.24	1.56	8.65	1.75	30.1	13		
11:20	3.00	160	12.20	1.56	8.65	1.77	31.2	12		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [X] HIGH DENSITY POLYETHYLENE
- [ ] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.25 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-201S	ROUND NO.	2
SAMPLE ID	OC-GW-201S	SITE TYPE	Superfund	DATE	5/18/2018
TIME	START 11:20 END 11:15	JOB NUMBER	6107180016	BOTTLE TIME	11:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.68 FT.

WELL DEPTH (TOR): ~ 14.95 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.93 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.04 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.04 GAL.

0.04

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:25	3.93	160	13.74	2.69	6.89	1.88	306	99	~ 12 ft.	
11:30	3.93	160	13.69	2.70	7.10	0.19	251	96		
11:35	3.93	160	13.65	2.62	7.60	0.01	85	88		
11:40	3.93	160	13.49	2.63	7.63	0.01	83	86		
11:45	3.93	160	13.45	2.62	7.64	0.01	81	85		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.04 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-202S	ROUND NO.	2
SAMPLE ID	OC-GW-202S	SITE TYPE	Superfund	DATE	5/15/2018
TIME	START 9:30 END 10:15	JOB NUMBER	6107180016	BOTTLE TIME	10:05

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.20 FT.

WELL DEPTH (TOR): ~ 13.3 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.23 FT.

SCREEN LENGTH: 8 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.37 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:35	6.23	150	15.52	0.744	8.88	7.11	7.2	73	~ 11 ft.	
9:40	6.23	150	14.93	0.738	8.18	1.46	3.4	102		
9:45	6.23	150	14.17	0.745	8.08	0.62	1.6	111		
9:50	6.23	150	13.65	0.749	8.12	0.30	4.3	117		
9:55	6.23	150	12.95	0.762	8.04	0.13	0.6	120		
10:00	6.23	150	12.86	0.764	8.01	0.01	1.3	123		
10:05	6.23	150	12.87	0.764	8.00	0.01	1.5	126		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.37 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-202D	ROUND NO.	2
SAMPLE ID	OC-GW-202D	SITE TYPE	Superfund	DATE	5/15/2018
TIME	START 10:15 END 11:20	JOB NUMBER	6107180016	BOTTLE TIME	10:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: DUP/MS/MSD

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER	5.57 FT.	WELL DEPTH (TOR)	~ 23.7 FT.	PID AMBIENT AIR	N/A PPM
FINAL DEPTH TO WATER	5.65 FT.	SCREEN LENGTH	10 FT.	PID WELL MOUTH	N/A PPM
DRAWDOWN VOLUME (final - initial x 0.16 {2-inch} or x 0.65 {4-inch})	0.01 GAL.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED		PRESSURE TO PUMP	N/A PSI
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	1.17 GAL.	<0.01		REFILL TIMER SETTING	N/A SEC.

WELL DIAMETER: 2 IN.

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:20	5.65	180	14.33	2.22	6.34	3.95	70.1	213	~ 20 ft.	
10:25	5.65	180	13.72	2.30	6.33	2.73	54.4	226		
10:30	5.65	180	13.82	2.35	6.31	2.44	10.3	229		
10:35	5.65	180	13.86	2.40	6.28	2.32	11.1	231		
10:40	5.65	180	13.90	2.40	6.26	2.30	10.7	232		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.17 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Collected DUP/MS/MSD

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-CA1	ROUND NO.	2
SAMPLE ID	OC-GW-CA1	SITE TYPE	Superfund	DATE	5/17/2018
TIME	START 7:45 END 8:25	JOB NUMBER	6107180016	BOTTLE TIME	8:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID	N/A	MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER		PROTECTIVE CASING STICKUP (FROM GROUND)	--- FT.
PROTECTIVE CASING / WELL DIFFERENCE	N/A FT.				
INITIAL DEPTH TO WATER	6.42 FT.	WELL DEPTH (TOR)	~ 9.27 FT.	PID AMBIENT AIR	N/A PPM
WELL DIAMETER	2 IN.				
FINAL DEPTH TO WATER	6.42 FT.	SCREEN LENGTH	5 FT.	PID WELL MOUTH	N/A PPM
DRAWDOWN VOLUME (final - initial x 0.16 {2-inch} or x 0.65 {4-inch})	<0.01 GAL.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED		PRESSURE TO PUMP	N/A PSI
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	1.37 GAL.	<0.01		REFILL TIMER SETTING	N/A SEC.
DISCHARGE TIMER SETTING	N/A SEC.				

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED	X		
COLLAR	X		

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
7:50	6.42	175	15.11	0.518	7.83	7.37	0.01	106	~ 8 ft.	
7:55	6.42	175	13.17	0.397	7.88	5.56	0.01	73		
8:00	6.42	175	12.95	0.391	7.90	4.97	0.01	69		
8:05	6.42	175	12.77	0.385	8.01	4.13	0.01	58		
8:10	6.42	175	12.72	0.384	7.99	3.96	0.01	59		
8:15	6.42	175	12.69	0.384	8.00	3.91	0.01	59		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.37 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	MP-2#13	ROUND NO.	2
SAMPLE ID	OC-MP2#13	SITE TYPE	Superfund	DATE	5/18/2018
TIME	START 8:30 END 9:05	JOB NUMBER	6107180016	BOTTLE TIME	8:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [ ] TOP OF WELL RISER [ ] TOP OF PROTECTIVE CASING [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: N/A FT.

WELL DEPTH (TOR): ~ 13.5 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: multi-port IN.

FINAL DEPTH TO WATER: N/A FT.

SCREEN LENGTH: multi-port FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: N/A

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.94 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:35	-	145	12.95	1.47	6.55	11.97	0.01	100	~ 13.5 ft.	Multi-port well
8:40	-	145	12.93	1.49	6.48	9.60	1.6	125		
8:45	-	145	12.93	1.50	6.44	8.95	2.6	138		
8:50	-	145	12.82	1.50	6.44	8.94	0.1	143		
8:55	-	145	12.76	1.51	6.44	8.91	0.1	147		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [X] HIGH DENSITY POLYETHYLENE
- [ ] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.94 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

MP-2 #13 replaces GW-42S

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-16RRR	ROUND NO.	2
SAMPLE ID	OC-PZ-16RRR	SITE TYPE	Superfund	DATE	5/16/2018
TIME	START 11:30 END 12:00	JOB NUMBER	6107180016	BOTTLE TIME	11:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [ ] TOP OF WELL RISER [X] TOP OF PROTECTIVE CASING [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.25 FT.

WELL DEPTH (TOR): ~ 6 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 0.75 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: 2 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: N/A

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: ~0.1 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:38	---	---	14.75	1.16	9.65	8.00	164	-50	~ 6 ft.	
	Well Dry	Sample Recharge								
11:50	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.1 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Well went dry; sample recharge

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-17RRR	ROUND NO.	2
SAMPLE ID	OC-PZ17RRR	SITE TYPE	Superfund	DATE	5/16/2018
TIME	START 10:20 END 10:45	JOB NUMBER	6107180016	BOTTLE TIME	10:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [ ] TOP OF WELL RISER [X] TOP OF PROTECTIVE CASING [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.08 FT.

WELL DEPTH (TOR): ~ 6.65 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 0.75 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: 1 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: N/A

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.1 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:25	---	---	15.55	0.692	11.04	4.25	139	-160	~ 6.5 ft.	
	Well Dry	Sample Recharge								
10:30	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.1 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Well went dry; sample recharge

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-18R	ROUND NO.	2
SAMPLE ID	OC-PZ-18R	SITE TYPE	Superfund	DATE	5/16/2018
TIME	START 9:05 END 9:38	JOB NUMBER	6107180016	BOTTLE TIME	9:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [ ] TOP OF WELL RISER [X] TOP OF PROTECTIVE CASING [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 1.80 FT.

WELL DEPTH (TOR): ~ 5.99 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 2.79 FT.

SCREEN LENGTH: 1.6 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: 0.04 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.05

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.78 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:10	2.72	120	13.69	6.32	10.35	2.33	228	-91	~ 5.5 ft.	
9:15	2.79	120	13.41	5.21	10.27	0.87	34.2	-101		
9:20	2.79	120	13.36	4.96	10.07	0.49	18.7	-89		
9:25	2.79	120	13.54	4.95	9.97	0.45	18.3	-84		
9:30	2.79	120	13.53	4.94	9.97	0.44	17.9	-81		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.78 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-24	ROUND NO.	2
SAMPLE ID	OC-PZ-24	SITE TYPE	Superfund	DATE	5/15/2018
TIME	START 7:45 END 8:30	JOB NUMBER	6107180016	BOTTLE TIME	8:20

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 8.35 FT.

WELL DEPTH (TOR): ~ 17.65 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 8.49 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.23 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
7:50	8.49	135	17.82	1.41	8.36	1.17	72.9	1	~ 16 ft.	
7:55	8.49	135	16.74	1.40	8.59	0.77	57.5	-15		
8:00	8.49	135	16.33	1.39	8.65	0.76	56.4	-22		
8:05	8.49	135	14.87	1.43	9.06	0.52	33.1	-42		
8:10	8.49	135	14.65	1.45	9.13	0.39	29.2	-45		
8:15	8.49	135	14.39	1.46	9.19	0.28	28.3	-49		
8:20	8.49	135	14.41	1.46	9.18	0.23	28.1	-51		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.23 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-25	ROUND NO.	2
SAMPLE ID	OC-PZ-25	SITE TYPE	Superfund	DATE	5/15/2018
TIME	START 8:30 END 9:05	JOB NUMBER	6107180016	BOTTLE TIME	8:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 8.06 FT.

WELL DEPTH (TOR): ~ 17.75 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 8.13 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.98 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:35	8.13	150	14.63	1.18	9.30	3.45	4.7	-17	~ 15 ft.	
8:40	8.13	150	14.30	1.17	9.03	2.14	4.8	19		
8:45	8.13	150	13.73	1.18	8.94	1.89	4.6	25		
8:50	8.13	150	13.57	1.19	8.90	2.25	4.9	27		
8:55	8.13	150	13.50	1.19	8.84	2.06	4.7	28		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.98 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-16R	ROUND NO.	2
SAMPLE ID	OC-GW-16R	SITE TYPE	Superfund	DATE	5/21/2018
TIME	START 8:00 END 9:10	JOB NUMBER	6107180016	BOTTLE TIME	8:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 10.60 FT.

WELL DEPTH (TOR): ~ 17.2 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 11.14 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.08 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.66 GAL.

0.05

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:10	11.07	170	19.99	0.247	7.37	2.21	164	82	~ 16 ft.	
8:15	11.14	160	16.42	0.171	9.32	0.31	193	-1		
8:20	11.14	160	16.13	0.164	9.39	0.23	236	-1		
8:25	11.14	160	15.88	0.167	9.58	0.11	228	-3		
8:30	11.14	160	15.81	0.165	9.40	0.03	228	-5		
8:35	11.14	160	15.75	0.164	9.39	0.01	228	-4		
8:40	11.14	160	15.71	0.164	9.37	0.01	228	-4		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.66 gal.

NOTES

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

SIGNATURE: Field Form w/ Signature on File

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107180016 | DATE: 5/22/2018

FIELD SAMPLE ID: OC-SW-ISCO2 | ACTIVITY TIME: START 8:20 END 8:35 | BOTTLE TIME: 8:25

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.33 ft.	SPEC. COND	0.822 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.17 ft.	D.O.	5.41 mg/L
TEMPERATURE	18.12 DEG C	SALINITY	--- %
TURBIDITY	88.1 NTU	ORP	108 mV
pH	7.09 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER South Ditch

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: Location prior to discharge into the East Ditch

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAI
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107180016 | DATE: 5/22/2018

FIELD SAMPLE ID: OC-SW-ISCO3 | ACTIVITY TIME: START 8:00 END 8:15 | BOTTLE TIME: 8:05

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.33 ft.	SPEC. COND	0.342 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.17 ft.	D.O.	8.78 mg/L
TEMPERATURE	20.39 DEG C	SALINITY	--- %
TURBIDITY	13.2 NTU	ORP	98 mV
pH	5.81 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER East Ditch

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: East Ditch; Up-stream of South Ditch confluence; Along Railway

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ]

TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAI
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107180016 | DATE: 5/22/2018

FIELD SAMPLE ID: OC-SW-PZ16RRR | ACTIVITY TIME: START 8:45 END 9:00 | BOTTLE TIME: 8:50

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.42 ft.	SPEC. COND	0.913 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.17 ft.	D.O.	9.68 mg/L
TEMPERATURE	17.07 DEG C	SALINITY	--- %
TURBIDITY	3.8 NTU	ORP	107 mV
pH	7.85 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER South Ditch

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: At location PZ-16RRR

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ] | SAMPLE OBSERVATIONS | ODOR _____ | COLOR _____ | FLOC OBSERVED _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

CLEAR OF LEAF LITTER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAI
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107180016 | DATE: 5/22/2018

FIELD SAMPLE ID: OC-SW-PZ17RRR | ACTIVITY TIME: START 9:05 END 9:20 | BOTTLE TIME: 9:10

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.42 ft.	SPEC. COND	0.506 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.17 ft.	D.O.	7.08 mg/L
TEMPERATURE	17.30 DEG C	SALINITY	--- %
TURBIDITY	14.0 NTU	ORP	83 mV
pH	9.03 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER South Ditch

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: At location PZ-17RRR

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAI
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107180016 | DATE: 5/22/2018

FIELD SAMPLE ID: OC-SW-PZ18R | ACTIVITY TIME START: 9:45 END: 10:20 | BOTTLE TIME: 9:50

QC SAMPLES COLLECTED: DUP/MS/MSD

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.67 ft.	SPEC. COND	0.829 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.33 ft.	D.O.	4.11 mg/L
TEMPERATURE	14.99 DEG C	SALINITY	--- %
TURBIDITY	8.2 NTU	ORP	79 mV
pH	9.01 UNITS		

EQUIPMENT USED

- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER

- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER: Weir Area

DECON FLUIDS USED:

- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: At location PZ-18R

SEDIMENT DATA

SEDIMENT SAMPLE START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT

- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION

- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED

- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES DUP/ MS/ MSD Collected

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAI
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107180016 | DATE: 5/22/2018

FIELD SAMPLE ID: OC-SW-SD17 | ACTIVITY TIME: START 9:25 END 9:40 | BOTTLE TIME: 9:30

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.50 ft.	SPEC. COND	0.985 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.25 ft.	D.O.	10.55 mg/L
TEMPERATURE	15.41 DEG C	SALINITY	--- %
TURBIDITY	1.71 NTU	ORP	78 mV
pH	8.83 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER South Ditch

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: Up-stream of location PZ-17RRR

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAI
Checked by: CTM

Appendix B

Chain of Custody Records

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298 360325-Boston
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

360325-Boston 360325-Boston

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carri	COC No: 480-113049-22977.1
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 2
Company: Olin Corporation				Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Wilmington MA Groundwater Quarterly	Project #: 48006612			
Site: Massachusetts	SSOW#:			

480-136030 COC

Analysis Reques

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Sulfate/Chloride	350.1 - Ammonia	6010MCP - Field filtered Al/Cr	2510B - Specific Cond.	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	D	N		
OC-GW-202S	5-15-18	10:05	G	Water	Y		1	1	1	1	4	
OC-GW-202D	5-15-18	10:40	G	Water	Y		1	1	1	1	4	
OC-GW-25	5-16-18	8:15	G	Water	Y		1	1	1	1	4	
OC-GW-78S	5-16-18	10:10	G	Water	Y		1	1	1	1	4	
OC-GW-79S	5-16-18	11:20	G	Water	Y		1	1	1	1	4	
OC-PZ-16RRR	5-16-18	11:50	G	Water	Y		1	1	1	1	4	
OC-PZ-17RRR	5-16-18	10:30	G	Water	Y		1	1	1	1	4	
OC-GW-18R	5-16-18	9:30	G	Water	Y		1	1	1	1	4	
OC-PZ-24	5-15-18	8:20	G	Water	Y		1	1	1	1	4	
OC-PZ-25	5-15-18	8:55	G	Water	Y		1	1	1	1	4	
DUP GW 202D	5-15-18	10:40	G	Water	Y	Y	1	1	1	1	4	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		5-16-18			5-16-18 1230	
2		5-16-18 1800			5-17-18 0100	
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2.4 #1

Ver: 08/04/2016

360325-Boston 360325-Boston 360325-Boston

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-113049-22977.2
Client Contact: Mr. Brian Guichard	Phone: 7786586171	E-Mail: becky.mason@testamericainc.com		Page: Page 2 of 2
Company: Olin Corporation				Job #:

Address: 51 Eames street	Due Date Requested:	Analysis Requested	Preservation Codes:
City: Wilmington	TAT Requested (days):		A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: MA, 01887			
Phone: 423-336-4012(Tel)	PO #: REWI0025		Other:
Email: beguichard@olin.com	WO #:		
Project Name: Olin Wilmington MA Groundwater Quarterly	Project #: 48006612		
Site: Massachusetts	SSOW#:		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Sulfate/Chloride	350.1 - Ammonia	6010MCP - Field filtered Al/Cr	2510B - Specific Cond.	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	D	N		
GW2021 MS	5-15-18	10:40	G	Water	Y	Y	1	1	1	1	4	
GW2021 MSD	5-15-18	10:40	G	Water	Y	Y	1	1	1	1	4	
				Water								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
		5-16-18			5-16-18 1200	X
	Relinquished by:	Date/Time: 5-16-18 1800	Company TA	Received by:	Date/Time: 5-17-18 0100	Company TAB
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2.4 #1

Ver: 08/04/2016

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

360325-Boston 360325-Boston 360325-Boston

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	COC No: 480-113051-22979.1
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com	Page: Page 1 of 2
Company: Olin Corporation		Analysis Requ	Job #:
Address: 51 Eames street	Due Date Requested:		Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
City: Wilmington	TAT Requested (days):		
State, Zip: MA, 01887			
Phone: 423-336-4012(Tel)	PO #: REWI0025		Other:
Email: beguichard@olin.com	WO #:		
Project Name: Olin Groundwater Semi-Annual	Project #: 48006612		
Site: Massachusetts	SSOW#:		

480-136191 COC

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Chloride & Sulfate	350.1 - Nitrogen, Ammonia	6010MCP - Diss. Al, Cr	2510B - Specific Conductance	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	D	N		
OC-GW-10S	5-18-18	9:55	G	Water	✓		1	1	1	1	4	
OC-GW-201S	5-18-18	11:45	G	Water	✓		1	1	1	1	4	
OC-GW-24	5-18-18	11:05	G	Water	✓		1	1	1	1	4	
~~OC-GW-26~~	~~5-17-18~~	~~8:15~~	~~G~~	~~Water~~	✓		1	1	1	1	4	
OC-GW-34D	5-17-18	9:45	G	Water	✓		1	1	1	1	4	
OC-GW-34SR	5-17-18	10:90	G	Water	✓		1	1	1	1	4	
OC-GW-35S	5-17-18	8:55	G	Water	✓		1	1	1	1	4	
OC-GW-42S (MP2 Port 13)	5-18-18	8:55	G	Water	✓		1	1	1	1	4	
OC-GW-43SR	5-18-18	7:55	G	Water	✓		1	1	1	1	4	
OC-GW-76S	5-18-18	10:30	G	Water	✓		1	1	1	1	4	
OC-GW-CA-1	5-17-18	8:15	G	Water	✓		1	1	1	1	4	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1					5-18-18 1335	
2		5-18-18 1800			5-19-18 0200	
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2.2 #1

Ver: 08/04/2016

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

360325-Boston 360325-Boston

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-113051-22979.2
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com		Page: Page 2 of 2
Company: Olin Corporation				Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Groundwater Semi-Annual	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Chloride & Sulfate	350.1 - Nitrogen, Ammonia	6010MCP - Diss. Al, Cr	2510B - Specific Conductance	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	D	N		
DUP GW 34D	5-17-18	9:45		Water	✓	✓	1	1	1	1	4	
GW34D MS		9:45		Water	✓	✓	1	1	1	1	4	
GW34D MSD		9:45		Water	✓	✓	1	1	1	1	4	
				Water	✓							

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1					5-18-18 1335	N
2		5-18-18 1800	TA		5-19-18 0200	TA
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 2.2 #1

Ver: 08/04/2016

360325-Boston

360325-Boston

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

480-136243 COC

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carr	COC No: 480-113052-22982.1
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation				Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Wilmington MA Plant B Quarterly May	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	350.1 - Nitrogen, Ammonia	6010MCP - Fe	MAVPH - MA VPH	8260MCP - 8260 TMPs only	8270_LL_MCP - 8270 NDPA and BEHP only	9040C - pH	Total Number of containers	Special Instructions/Note:
			Preservation Code:				S	D	A	A	N	N		
OC-GW-16R	5-21-18	8:40	G	Water	✓		1	1	3	3	2	1	11	
Trip Blank				Water									4	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1					5-21-18 1500	TA
2		5-22-18 1800	TA		5-22-18 0130	TAS
3						

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
		2.4 #1

Ver: 08/04/2016

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

360325-Boston 360325-Boston 360325-Boston

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

480-136330 COC

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	COC No: 480-113050-22978.1
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com	Page: Page 1 of 1
Company: Olin Corporation		Analysis Re	Job #:
Address: 51 Eames street	Due Date Requested:		
City: Wilmington	TAT Requested (days):		
State, Zip: MA, 01887			
Phone: 423-336-4012(Tel)	PO #: REWI0025		
Email: beguichard@olin.com	WO #:		
Project Name: Olin Wilmington Surface Water Qurarterly	Project #: 48006612		
Site: Massachusetts	SSOW#:		

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	350.1 - Nitrogen, Ammonia	300.0_28D - Sulfate and Chloride	2510B, 353.2_Nitrite, Nitrate_Calc	6010MCP - Diss. Al, Cr, Na	6010MCP - Total Al, Cr, Na	Total Number of containers	Special Instructions/Note:
			Preservation Code:				S	N	N	D	D		
OC-ISCO1	5-22-18	10:30	G	Water	✓		1	1	2	1	1	6	
OC-ISCO2		8:25		Water	✓		1	1	2	1	1	6	
OC-ISCO3		8:05		Water	✓		1	1	2	1	1	6	
OC-PZ-16RRRSW		8:50		Water	✓		1	1	2	1	1	6	
OC-PZ-17RRRSW		9:10		Water	✓		1	1	2	1	1	6	
OC-PZ-18RSW		8:50		Water	✓		1	1	2	1	1	6	
OC-SD-17		9:30		Water	✓		1	1	2	1	1	6	
DUP PZ18RSW		9:50		Water	✓		1	1	2	1	1	6	
PZ18RSW MS		9:50		Water	✓		1	1	2	1	1	6	
PZ18RSW_MSD		9:50		Water	✓		1	1	2	1	1	6	
				Water									

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1					5-22-18 1215	TA
2		5-22-18	TA		5-23-18 0115	TAS
3						

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2.8 #1

Ver: 08/04/2016

Appendix C

Cap Inspection Log

Olin Wilmington Containment Area Temporary Cap Inspection			
Date:	4/2 01 2013	**Inspector:**	Brian Guichard

Inspection Checklist

Feature	Observations		Notes
Drain	☑ Clear and Functioning	☐ Requires Maintenance	Date Cleared:
Sewn Seams	☐ Intact	☑ Requires Repairs	Date Repaired:
Ballast	☑ Intact	☐ Requires Replacement	Date Replaced:
Panels	X Repair Locations		Date: ongoing
Ballest Locations	O Locations Replaced or Repaired		
Seam Locations	— Locations Repaired		

O Denotes Areas needing Patch Repair
— Denotes Area needing Seam Repair
△ Denotes Area left pulled back and unballested After Recent well Drilling operations. Repairs will commence when warm Dry weather is present so Adhesive tape will bond.

Appendix A2

Third Quarter 2018 Sampling Event

Interim Response Steps Field Activity Report
Third Quarter 2018 Sampling Event

Olin Chemical Superfund Site
Wilmington, Massachusetts
Project 6107180016

Prepared for:

Olin Corporation
3855 North Ocoee St., Suite 200, Cleveland, TN 37312

3-Dec-18

Interim Response Steps Field Activity Report
Third Quarter 2018 Sampling Event

Olin Chemical Superfund Site
Wilmington, Massachusetts

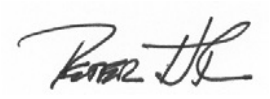
Project 6107180016

Prepared for:
Olin Corporation
3855 North Ocoee St., Suite 200, Cleveland, TN 37312

Prepared by:
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090

3-Dec-18

Prepared and Reviewed by:



Peter H. Thompson
Project Manager

Michael J. Murphy
Project Principal

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Figure 2 Plant B Monitoring Program Sampling Locations

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Appendix A Field Data Records and Field Instrument Calibration Records
Appendix B Chain of Custody Records

List of acronyms

Amec Foster Wheeler	Amec Foster Wheeler Environment and Infrastructure, Inc.
DO	Dissolved Oxygen
IRSWP	Interim Response Steps Work Plan
LNAPL	Light Non-Aqueous Phase Liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
NTU	Nephelometric Turbidity Units
ORP	Oxidation/Reduction Potential
RI/FS	Remedial Investigation/Feasibility Study
SC	Specific Conductivity
TAL	TestAmerica Laboratories, Inc.

USEPA	United States Environmental Protection Agency
UV	Ultraviolet

1.0 Introduction

On behalf of the Olin Corporation (Olin), Wood Environment & Infrastructure Solutions, Inc. (Wood E&IS) formerly Amec Foster Wheeler, presents this summary report for field activities completed in association with the Third Quarter 2018 groundwater and surface water monitoring for the Slurry Wall/Cap Monitoring Program and the Plant B Monitoring Program. These activities were conducted consistent with the requirements and procedures contained in the Final Interim Response Steps Work Plan (IRSWP), Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts dated August 8, 2008 and the Volume IIIB, the Quality Assurance Project Plan, of the Final Remedial Investigation/Feasibility Study (RI/FS) Work Plan dated August 14, 2009 (MACTEC Engineering and Consulting, Inc. [MACTEC], 2009).

1.1 Limitations

This report, including its findings, opinions, and conclusions, is intended for the exclusive use and benefit of, and may be relied upon only by Olin Corporation and the United States Environmental Protection Agency (USEPA).

2.0 Slurry Wall/Cap monitoring program

The purpose of the Slurry Wall/Cap Monitoring Program is to monitor the concentrations of select constituents in groundwater and surface water in areas adjacent to and within the South Ditch of the former Olin Facility located at 51 Eames Street, Wilmington, Massachusetts.

The Third Quarter 2018 groundwater and surface water monitoring program includes collecting groundwater level measurements from select monitoring wells and piezometers, collecting and analyzing groundwater samples from five monitoring wells and five piezometers, and collecting and analyzing surface water samples from seven locations within the East Ditch and South Ditch. Groundwater and surface water sample locations are listed in **Table 1** and shown on **Figure 1**. The groundwater and surface water sampling program is further described in the Final IRSWP (MACTEC, 2008), which has been approved by the USEPA.

2.1 Scope of Work

The Slurry Wall/Cap Monitoring Program for this sampling event consists of collecting groundwater level measurements in the vicinity of the South Ditch area; collecting and analyzing groundwater samples from the following monitoring wells: GW-25, GW-78S, GW-79S, GW-202S, and GW-202D; and piezometers: PZ-16RRR, PZ-17RRR, PZ-18R, PZ-24, and PZ-25; collecting and analyzing surface water samples from the following locations: ISCO-1, ISCO-2, ISCO-3, SD-17, PZ-16RRR, PZ-17RRR, and PZ-18R; and downloading water level and barometric pressure data from data loggers that have been installed in the following wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, PZ-24, PZ-25, and GW-6S. Monitoring wells, piezometers, and surface water sample locations are shown on **Figure 1**.

2.1.1 Groundwater Level Measurement

On August 6 and 7, 2018, Olin personnel completed a site reconnaissance of the monitoring well locations in the Slurry Wall/Cap Monitoring Program and collected groundwater level measurements. This included measuring depth to groundwater from 22 monitoring wells and piezometers using a water level meter. Groundwater level measurements and calculated groundwater elevations are summarized in **Table 2**.

2.1.2 Groundwater Sampling

On August 6 and 7, 2018, Olin personnel sampled groundwater from five monitoring wells and five piezometers using 2010 USEPA low stress (low flow) groundwater sampling methods.

Prior to low flow sampling, a Horiba U-52 multi-parameter water quality meter and turbidity meter were calibrated according to the instrument manufacturer's specifications using certified calibration solutions.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at each monitoring location. During sampling activities, the purged groundwater was continuously monitored using the multi-parameter water quality meter for pH, temperature, specific conductivity (SC), dissolved oxygen (DO), oxidation/reduction potential (ORP), and turbidity. Well purging continued at each location until these field parameters stabilized as indicated in Appendix A of the IRSWP.

Piezometer wells PZ-16RRR and PZ-17RRR went dry upon purging and could not be sampled by low flow methods. These wells were purged dry and sampled upon recovery, which is the alternative approved method. Samples collected by this method typically have elevated turbidity. The final low flow purging field parameter measurements are presented in **Table 3**. Field data records for each groundwater monitoring location are attached in **Appendix A**.

Upon stabilization of groundwater parameters, groundwater samples were collected by directly filling the laboratory prepared sample bottles. A 0.45-micron pore diameter, in-line Teflon™ filter was used to field filter groundwater for dissolved metal analysis in accordance with the IRSWP. The samples were placed on ice and transferred to TestAmerica Laboratories, Inc. (TAL) of Buffalo, New York, under chain-of-custody for chemical analyses as summarized in **Table 4**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data are presented in the January 2019 Semi-Annual Status Report.

Purged groundwater from each monitoring well was collected in collapsible plastic containers, transported to the Block House building, adjacent to the Plant B groundwater treatment building, and containerized in a secured 55-gallon drum. Olin characterizes and disposes of that material in accordance with applicable regulations.

2.1.3 Surface Water Sampling

On August 8, 2018, Olin personnel indicated all seven surface water sample locations were dry within the East Ditch and South Ditch and no surface water samples were collected.

2.1.4 Data Logger Data Download

Data loggers are deployed in 10 monitoring wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, PZ-24, PZ-25, and GW-6S, to continuously monitor groundwater elevation proximate to the cap area. Wood E&IS downloaded data from the 10 data loggers, along with data from the barometric pressure data logger deployed in GW-35S. Downloaded data from the loggers are presented in the January 2019 Semi-Annual Status Report.

2.1.5 Cap Inspection

The temporary cap is composed of ten large and three small scrim reinforced polyethylene sheets of 8 mil thickness. These sheets were factory fabricated with double welded seams from smaller, narrower panels. The seams between the large sheets were field fabricated by folding and sewing the edges of the sheets together with an ultraviolet (UV) -resistant thread. The original temporary cap was installed in 2001 and consisted of a 6-mil thick sheet. Due to deterioration of the 6-mil sheet, an 8-mil thick cover was installed directly over the 6-mil cover and re-ballasted with sand bags to resist wind uplift.

Since November 2016, Olin on-site personnel have been conducting the cap inspections and integrating the inspections with the maintenance repair activities. Olin has reduced the official inspection frequency from quarterly to semi-annually with informal inspections to continue to ensure that any potential significant issues are addressed in a timely fashion. Accordingly, there was no formal cap inspection in the Third Quarter 2018.

3.0 Plant B monitoring program

The purpose of the Plant B groundwater sampling and analysis program is to monitor groundwater quality at select monitoring wells and conduct gauging activities to determine groundwater elevations and light non-aqueous phase liquid (LNAPL) thickness.

3.1 Scope of Work

The Third Quarter 2018 Plant B Monitoring Program consisted of measuring groundwater levels in 28 monitoring wells within the Plant B area, gauging LNAPL thickness in monitoring wells where LNAPL was observed, and USEPA low stress (low flow) groundwater sampling at monitoring well: GW-16R. Groundwater monitoring wells from the Plant B Monitoring Program are shown on **Figure 2**.

3.1.1 Groundwater Level Measurements and LNAPL Gauging

On August 31, 2018, Olin personnel completed a site reconnaissance of the monitoring well locations in the Plant B Monitoring Program and collected groundwater level measurements and LNAPL thickness measurements. Depth to groundwater was measured in 28 monitoring wells using a water interface probe. For wells with observed LNAPL, LNAPL thickness was measured using an oil/water interface probe. Groundwater level measurements, groundwater elevations, and LNAPL thickness measurements are summarized in **Table 5**.

3.1.2 Groundwater Sampling

On August 8, 2018, Olin personnel sampled groundwater from monitoring well GW-16R following the 2010 USEPA low stress (low flow) groundwater sampling method.

Prior to low flow sampling, a Horiba U-52 multi-parameter water quality meter and turbidity meter were calibrated according to the instrument manufacturer's specifications using certified calibration solutions.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at the sample location. During sampling activities, the purged groundwater was continuously monitored using the Horiba U-52 multi-parameter water quality meter for pH, temperature, SC, DO, ORP, and turbidity. Well purging continued at the sample location until these field parameters stabilized as indicated in Appendix A of the IRSWP. The final low flow purging field parameter measurements are presented in **Table 6**. Field data records for each groundwater monitoring location are attached in **Appendix A**.

Upon groundwater parameter stabilization, groundwater samples were collected by directly filling the laboratory prepared glassware. The samples were placed on ice, and were transferred to TAL of Buffalo, New York, under chain-of-custody for chemical analyses as summarized in **Table 7**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data will be presented in the January 2019 Semi-Annual Status Report.

Purged groundwater from sampling activities was collected in collapsible plastic containers, transported to the Block House building, adjacent to the Plant B groundwater treatment building, and containerized in a secured 55-gallon drum. Olin characterizes and disposes of that material in accordance with applicable regulations.

4.0 References

MACTEC Engineering and Consulting, Inc. (MACTEC), August 8, 2008. Final Interim Response Steps Work Plan, Olin Chemical Superfund Site, Wilmington, Massachusetts.

MACTEC, August 14, 2009. Final RI/FS Work Plan, Olin Chemical Superfund Site, Wilmington, Massachusetts.

Tables

Table 1
Groundwater and Surface Water Sampling Locations
Slurry Wall/Cap Monitoring Program
Third Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Groundwater	Surface Water
GW-25	ISCO1*
GW-78S	ISCO2*
GW-79S	ISCO3*
GW-202S	PZ-16RRR*
GW-202D	PZ-17RRR*
PZ-16RRR #	PZ-18R*
PZ-17RRR #	SD-17*
PZ-18R	
PZ-24	
PZ-25	
GW-16R ^	

Notes:
- Piezometer replaced in South Ditch
^ - Plant B Monitoring Well
* - South Ditch and East Ditch dry, no samples collected

Prepared by: CTM 8/31/2018
Checked by: SAI 8/31/2018

Table 2
Groundwater Elevations
Slurry Wall/Cap Monitoring Program
Third Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL ID	Reference Elevation	Depth to Water (1, 2)	Groundwater Elevation (3)	Notes	Date Measured
I.D.	(ft msl)	(ft)	(feet NGVD)		
GW-10S	89.79	8.67	81.12	TOC	8/7/2018
GW-24	83.43	2.45	80.98		8/7/2018
GW-25	85.97	5.45	80.52		8/7/2018
GW-26*	84.93	*	---	*	
GW-34D	90.36	7.50	82.86		8/7/2018
GW-34SR	89.13	6.22	82.91		8/7/2018
GW-35S	88.51	7.41	81.10		8/7/2018
GW-39 ^	83.64	7.64	76.00		8/7/2018
GW-42S**	84.18	**	---	**	
GW-43SR	87.86	6.84	81.02		8/7/2018
GW-55D	81.95	2.92	79.03		8/7/2018
GW-55S	81.70	2.55	79.15		8/7/2018
GW-76S	88.45	7.27	81.18	TOC	8/7/2018
GW-78S	84.89	4.74	80.15		8/6/2018
GW-79S	81.54	4.61	76.93		8/7/2018
GW-201S	83.29	3.73	79.56		8/7/2018
GW-202D	86.52	6.15	80.37		8/6/2018
GW-202S	86.97	6.72	80.25		8/6/2018
GW-CA1	88.01	6.88	81.13		8/7/2018
PZ-16RRR/IN	***	3.79	---		8/7/2018
PZ-16RRR/OUT (4)	***	NM	---	NM	---
PZ-17RRR/IN	***	2.55	---		8/7/2018
PZ-17RRR/OUT (4)	***	NM	---	NM	
PZ-18R/IN	82.42	2.01	80.41		8/7/2018
PZ-18R/OUT (4)	82.42	NM	---	NM	
PZ-24	89.43	8.97	80.46		8/6/2018
PZ-25	88.90	8.58	80.32		8/6/2018

Notes:

Prepared by: SAI 8/31/2018
Checked by: CTM 8/31/2018

(1) - Measurement from top of PVC. If no PVC, measurement from TOC
(2) - Collected using a Solinst water interface probe
(3) - Groundwater Elevation = Reference Elevation - Depth to Water
(4) - Reported elevation of surface water adjacent to piezometer
TOC - Water level measurement taken from Top of Casing
* - Well removed for detention basin construction
** - Well destroyed during paving
*** - Piezometer replaced in South Ditch. Not surveyed
NGVD - National Geodetic Vertical Datum
msl - mean sea level
ft - feet
NM - not measured
^ - Well heaving

Table 3
Final Field Parameters for Groundwater Sampling
Slurry Wall/Cap Monitoring Program
Third Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Slurry Wall/Cap Monitoring Well Samples						**Quarterly Slurry Wall/Cap Piezometer Samples**				
Location ID	GW-25	GW-78S	GW-79S	GW-202S	GW-202D	PZ-16RRR	PZ-17RRR	PZ-18R	PZ-24	PZ-25
Date	8/7/2018	8/6/2018	8/7/2018	8/6/2018	8/6/2018	8/7/2018	8/7/2018	8/7/2018	8/6/2018	8/6/2018
Depth to Water (ft)	5.77	4.97	4.64	6.75	6.17	Dry	Dry	2.89	9.09	8.59
Temperature (° C)	15.91	20.36	18.05	16.88	17.20	24.11	20.98	21.92	20.27	18.02
Specific Conductivity (mS/cm)	0.887	1.18	1.62	0.859	3.54	1.79	0.571	2.03	1.76	1.14
pH (standard units)	6.36	6.44	6.14	6.46	5.63	6.27	6.70	6.25	6.87	6.81
Dissolved Oxygen (mg/L)	0.95	0.17	0.17	0.21	0.01	6.87	1.98	7.19	6.12	1.60
Turbidity (NTU)	0.10	257	53.4	0.10	12.3	89.7	982	11.9	43.1	13.3
ORP (millivolts)	-169	12	-9	140	248	-80	78	-124	-88	23

Notes:
ft - feet
mS/cm - milliSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts
Dry = purged dry and sampled upon recovery

Prepared by: CTM 8/31/2018
Checked by: SAI 8/31/2018

Table 4
Groundwater Laboratory Analytical Program
Slurry Wall/Cap Monitoring Program
Third Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
Chloride	EPA 300.0	0.28	mg/L
Specific Conductivity	SM18 2510B	1.0	µmhos/cm
Sulfate	EPA 300.0	0.35	mg/L
Filtered Metals			
Aluminum, filtered	SW846 6010B	60	µg/L
Chromium, filtered	SW846 6010B	1.0	µg/L

Notes:
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µmhos/cm = µS/cm (microSiemens per centimeter)
1 µS/cm = 0.001 mS/cm (milliSiemens per centimeter)
µg/L - micrograms per liter

Prepared by: CTM 8/31/2018
Checked by: SAI 8/31/2018

Table 5
Groundwater Elevations
Plant B Monitoring Program
Third Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL ID	Reference Elevation (1)	Depth to Water (2)	Depth to Product (3)	Product Thickness (4)	Groundwater Elevation (5)	Date Measured
I.D.	(ft msl)	(ft)	(ft)	(ft)	(feet NGVD)	
B-2	90.48	11.76	NPD	NA	78.72	8/31/2018
B-3	90.32	11.26	NPD	NA	79.06	8/31/2018
B-5R	91.38	11.73	NPD	NA	79.65	8/31/2018
B-7A	88.81	8.38	NPD	NA	80.43	8/31/2018
B-17	91.55	10.29	NPD	NA	81.26	8/31/2018
GW-13	90.57	11.60	NPD	NA	78.97	8/31/2018
GW-14	88.70	9.61	NPD	NA	79.09	8/31/2018
GW-15	90.01	9.30	NPD	NA	80.71	8/31/2018
GW-16R	92.46	11.45	NPD	NA	81.01	8/31/2018
GW-23	91.04	12.28	11.85	0.43	79.17	8/31/2018
GW-52S	87.95	9.27	NPD	NA	78.68	8/31/2018
GW-100	90.15	11.46	NPD	NA	78.69	8/31/2018
GW-101	90.14	11.45	NPD	NA	78.69	8/31/2018
GW-102	89.00	10.30	NPD	NA	78.70	8/31/2018
IW-1	90.71	11.65	NPD	NA	79.06	8/31/2018
IW-2	90.53	11.60	11.58	0.02	78.95	8/31/2018
IW-3	90.76	11.76	NPD	NA	79.00	8/31/2018
IW-6	89.15	10.63	NPD	NA	78.52	8/31/2018
IW-7	90.10	11.34	NPD	NA	78.76	8/31/2018
IW-8	89.94	11.17	11.16	0.01	78.78	8/31/2018
IW-9	89.78	10.97	NPD	NA	78.81	8/31/2018
IW-10	90.43	11.65	NPD	NA	78.78	8/31/2018
IW-11	89.92	11.20	11.18	0.02	78.74	8/31/2018
IW-12	90.31	11.62	NPD	NA	78.69	8/31/2018
IW-13	89.90	11.05	NPD	NA	78.85	8/31/2018
PID	89.97	11.24	11.23	0.01	78.74	8/31/2018
P5	90.45	11.65	11.63	0.02	78.82	8/31/2018
12-IN	89.84	10.87	NPD	NA	78.97	8/31/2018

Notes:

Prepared by: CTM 8/31/2018

Checked by: SAI 8/31/2018

(1) - Reference elevations surveyed 11/97. New TOC survey by Dana Perkins 4-5/98

(2) - Top of PVC. If no PVC, measurement from top of steel casing

(3) - Collected using a Solinst water interface probe or Geotech oil/water interface probe

(4) - If sheen is noted, a product thickness of 0.01 feet will be used to calculate the groundwater elevation

(5) - Groundwater Elevation = Reference Elevation - (Depth to Water - (Product Thickness x 0.95))

TOC - Top of Casing

NPD - No Product Detected

NA - Not Applicable

NGVD - National Geodetic Vertical Datum

msl - mean sea level

ft - feet

East Ditch - No sheen noted; Observed OK

Table 6
Final Field Parameters for Groundwater Sampling
Plant B Monitoring Program
Third Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Plant B Monitoring Well Samples	
Location	GW-16R
Date	8/8/2018
Depth to Water (ft)	12.70
Temperature (° C)	19.52
Specific Conductivity (mS/cm)	0.172
pH (standard units)	6.81
Dissolved oxygen (mg/L)	0.22
Turbidity (NTU)	4.8
Oxidation Reduction Potential (mV)	-21

Notes:
ft - feet
mS/cm - milliSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts

Prepared by: CTM 8/31/2018
Checked by: SAI 8/31/2018

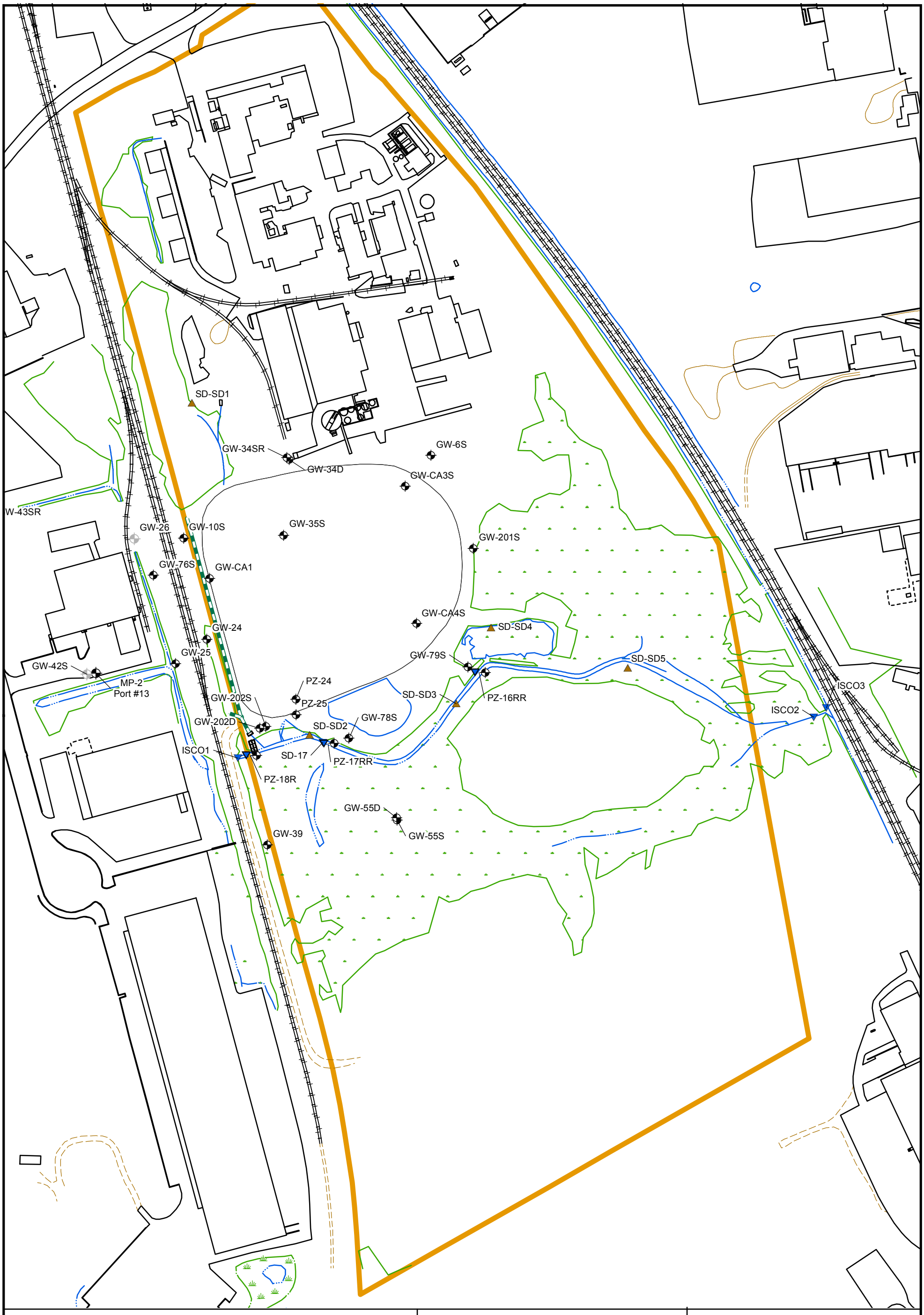
Table 7
Groundwater Laboratory Analytical Program
Plant B Monitoring Program
Third Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Volatile organic compounds (VOC)			
2,4,4-Trimethyl-1-pentene	SW846 8260B	0.40	µg/L
2,4,4-Trimethyl-2-pentene	SW846 8260B	0.43	µg/L
Semivolatile organic compounds (SVOC)			
N-nitrosodiphenylamine	SW846 8270C	0.07	µg/L
bis(2-ethylhexyl)phthalate	SW846 8270C	0.42	µg/L
Volatile Petroleum Hydrocarbons (VPH)			
C5-C8 Aliphatics	MA VPH	1.5	µg/L
C5-C8 Aliphatics, Unadjusted	MA VPH	1.5	µg/L
C9-C12 Aliphatics	MA VPH	1.5	µg/L
C9-C12 Aliphatics, Unadjusted	MA VPH	1.5	µg/L
C9-C10 Aromatics	MA VPH	0.50	µg/L
Methyl-tert-butyl-ether (MTBE)	MA VPH	0.25	µg/L
Benzene	MA VPH	0.25	µg/L
Ethylbenzene	MA VPH	0.25	µg/L
m,p-Xylene	MA VPH	0.50	µg/L
o-Xylene	MA VPH	0.25	µg/L
Toluene	MA VPH	0.25	µg/L
Naphthalene	MA VPH	0.25	µg/L
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
pH	SM 4500 H+ B	0.10	SU
Filtered Metals			
Iron, Filtered	SW846 6010B	19	µg/L

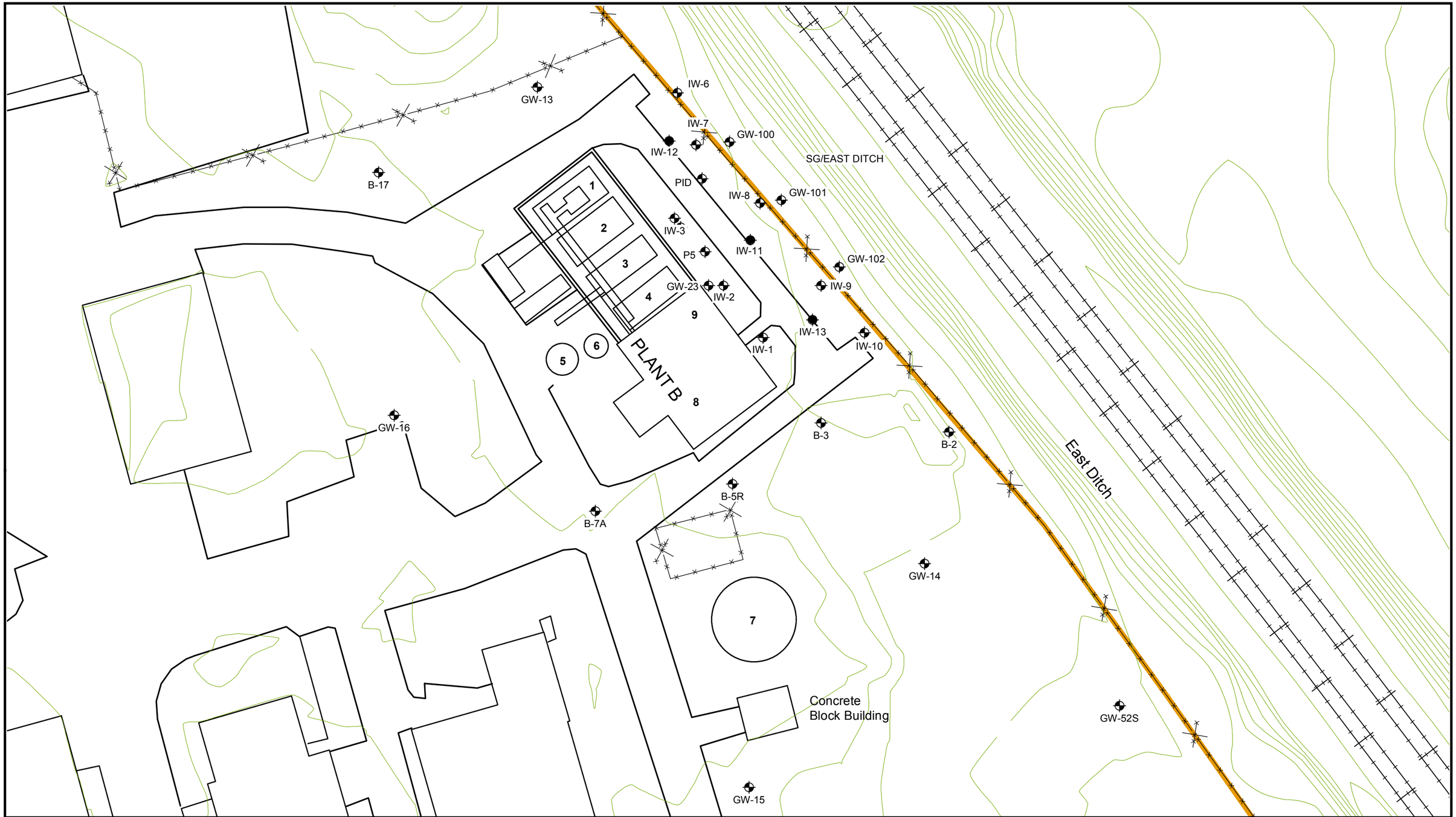
Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
SU - standard units

Prepared by: CTM 8/31/2018
Checked by: SAI 8/31/2018

Figures



\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd June 07, 2018 DWN: emily.gardiner CHKD: AKN



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Monitoring Well
- Recovery Well
- Elevation Contours

wood.
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 2
Plant B Monitoring Program
Sampling Locations

Interim Response Steps Field Activity Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/07/18 | Checked/Date: CTM 06/07/18

Document: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\Figures\Figure 3 - Plant B Monitoring Program Sampling Locations.pdf

Appendix A

Field Data Records and Field Instrument Calibration Records

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME: Olin Chemical Superfund Site - 2nd Quarter Sampling
PROJECT NUMBER: 6107180016
PROJECT LOCATION: 51 Eames St, Wilmington, MA
WEATHER CONDITIONS (AM):
WEATHER CONDITIONS (PM):

TASK NO: DATE: 8/6/2018
AMEC CREW: Olin - BEG
SAMPLER NAME: Brian Guichard
SAMPLER SIGNATURE: Field Form w/ Signature on File
CHECKED BY: CTM DATE: 9/14/2018

MULTI-PARAMETER WATER QUALITY METER

METER TYPE: Horiba
MODEL NO.: U-52
UNIT ID NO.: Olin

AM CALIBRATION — Start Time: End Time:

PM CALIBRATION CHECK — Start Time: End Time:

	Units	Standard Value	Meter Value	*Acceptance Criteria (AM)	Standard Value	Meter Value	*Acceptance Criteria (PM)
pH (4)	SU	4.0	4.01	+/- 0.1 pH Units			
pH (7)	SU	7.0	-	+/- 0.1 pH Units	4.0	4.02	+/- 0.3 pH Units
pH (10)	SU	10.0	-	+/- 0.1 pH Units			
Redox	+/- mV		294	+/- 10 mV		309	+/- 10 mV
Conductivity	mS/cm	4.49	4.50	+/- 3% of standard	4.49	4.49	+/- 5% of standard
DO (saturated)	%		-	+/- 2% of standard			
DO (saturated)	mg/L[1] (see Chart 1)	-	7.93	+/- 0.2 mg/L	-	8.68	+/- 0.5 mg/L of standard
DO (<0.1)	mg/L	<0.1	-	< 0.5 mg/L			
Temperature	°C		27.43			22.63	
Baro. Press.	mmHg		-			-	

TURBIDITY METER

METER TYPE: Horiba
MODEL NO.: U-52
UNIT ID NO.: Olin

	Units	Standard Value	Meter Value	Standard Value	Meter Value	*Acceptance Criteria (PM)
Standard	NTU	0	0.0	10	0.0	+/- 5% of standard
Standard	NTU	20	-	20	-	
Standard	NTU	100	-	100	-	
Standard	NTU	800	-	800	-	

PHOTOIONIZATION DETECTOR

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Methane	%	50		50	+/- 10% of standard
O_2	%	20.9		20.9	+/- 10% of standard
H_2S	ppmv	25		25	+/- 10% of standard
CO	ppmv	50		50	+/- 10% of standard

OTHER METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

See Notes Below for Additional Information

[X] Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above **(see notes)**.
[ ] Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source:
Lot#/Date Produced:
Trip Blank Source: Lab
Sample Preservatives Source: Lab
Disposable Filter Type: Pine 0.45µm
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L)
- Other
- Other
- Other

	Cal. Standard Lot Number	Exp. Date
pH (4)	Olin-Horiba Auto-Cal Solution	Olin-Horiba Auto-Cal
pH (7)	--	--
pH (10)	--	--
ORP	--	--
Conductivity	--	--
0 Turb. Stan.	Olin-Horiba Cal Set	Olin-Horiba Cal Set
20 Turb. Stan.		
100 Turb. Stan.		
800 Turb. Stan.		
PID Span Gas		
O_2-LEL Span Gas		
DO		

NOTES:

wood.

* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-Field Calibration) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additional acceptance criteria obtained from instrument specific manufacturer recommendations.
** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.
1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-Field Calibration), dated 1/19/2010.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME: Olin Chemical Superfund Site - 2nd Quarter Sampling
PROJECT NUMBER: 6107180016
PROJECT LOCATION: 51 Eames St, Wilmington, MA
WEATHER CONDITIONS (AM):
WEATHER CONDITIONS (PM):

TASK NO: DATE: 8/7/2018
AMEC CREW: Olin - BEG
SAMPLER NAME: Brian Guichard
SAMPLER SIGNATURE: Field Form w/ Signature on File
CHECKED BY: CTM DATE: 9/14/2018

MULTI-PARAMETER WATER QUALITY METER

METER TYPE: Horiba
MODEL NO.: U-52
UNIT ID NO.: Olin

AM CALIBRATION — Start Time: End Time:

PM CALIBRATION CHECK — Start Time: End Time:

	Units	Standard Value	Meter Value	*Acceptance Criteria (AM)	Standard Value	Meter Value	*Acceptance Criteria (PM)
pH (4)	SU	4.0	4.00	+/- 0.1 pH Units			
pH (7)	SU	7.0	-	+/- 0.1 pH Units	4.0	4.01	+/- 0.3 pH Units
pH (10)	SU	10.0	-	+/- 0.1 pH Units			
Redox	+/- mV		268	+/- 10 mV		233	+/- 10 mV
Conductivity	mS/cm	4.49	4.49	+/- 3% of standard	4.49	4.45	+/- 5% of standard
DO (saturated)	%		-	+/- 2% of standard			
DO (saturated)	mg/L[1] (see Chart 1)	-	9.24	+/- 0.2 mg/L	-	10.12	+/- 0.5 mg/L of standard
DO (<0.1)	mg/L	<0.1	-	< 0.5 mg/L			
Temperature	°C		22.25			21.87	
Baro. Press.	mmHg		-			-	

TURBIDITY METER

METER TYPE: Horiba
MODEL NO.: U-52
UNIT ID NO.: Olin

	Units	Standard Value	Meter Value	Standard Value	Meter Value	*Acceptance Criteria (PM)
Standard	NTU	0	0.0	10	0.0	+/- 5% of standard
Standard	NTU	20	-	20	-	
Standard	NTU	100	-	100	-	
Standard	NTU	800	-	800	-	

PHOTOIONIZATION DETECTOR

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Methane	%	50		50	+/- 10% of standard
O_2	%	20.9		20.9	+/- 10% of standard
H_2S	ppmv	25		25	+/- 10% of standard
CO	ppmv	50		50	+/- 10% of standard

OTHER METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

See Notes Below for Additional Information

[X] Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above **(see notes)**.

[ ] Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source:
Lot#/Date Produced:
Trip Blank Source: Lab
Sample Preservatives Source: Lab
Disposable Filter Type: Pine 0.45µm
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L)
- Other
- Other
- Other

	Cal. Standard Lot Number	Exp. Date
pH (4)	Olin-Horiba Auto-Cal Solution	Olin-Horiba Auto-Cal
pH (7)	--	--
pH (10)	--	--
ORP	--	--
Conductivity	--	--
0 Turb. Stan.	Olin-Horiba Cal Set	Olin-Horiba Cal Set
20 Turb. Stan.		
100 Turb. Stan.		
800 Turb. Stan.		
PID Span Gas		
O_2-LEL Span Gas		
DO		

NOTES:

wood.

* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-Field Calibration) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additional acceptance criteria obtained from instrument specific manufacturer recommendations.

** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.

1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-Field Calibration), dated 1/19/2010.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME: Olin Chemical Superfund Site - 2nd Quarter Sampling
PROJECT NUMBER: 6107180016
PROJECT LOCATION: 51 Eames St, Wilmington, MA
WEATHER CONDITIONS (AM):
WEATHER CONDITIONS (PM):

TASK NO: DATE: 8/8/2018
AMEC CREW: Olin - BEG
SAMPLER NAME: Brian Guichard
SAMPLER SIGNATURE: Field Form w/ Signature on File
CHECKED BY: CTM DATE: 9/14/2018

MULTI-PARAMETER WATER QUALITY METER

METER TYPE: Horiba
MODEL NO.: U-52
UNIT ID NO.: Olin

AM CALIBRATION — Start Time: End Time:

PM CALIBRATION CHECK — Start Time: End Time:

	Units	Standard Value	Meter Value	*Acceptance Criteria (AM)	Standard Value	Meter Value	*Acceptance Criteria (PM)
pH (4)	SU	4.0	4.00	+/- 0.1 pH Units			
pH (7)	SU	7.0	-	+/- 0.1 pH Units	4.0	4.02	+/- 0.3 pH Units
pH (10)	SU	10.0	-	+/- 0.1 pH Units			
Redox	+/- mV		261	+/- 10 mV		281	+/- 10 mV
Conductivity	mS/cm	4.49	4.48	+/- 3% of standard	4.49	4.46	+/- 5% of standard
DO (saturated)	%		-	+/- 2% of standard			
DO (saturated)	mg/L[1] (see Chart 1)	-	9.15	+/- 0.2 mg/L	-	10.85	+/- 0.5 mg/L of standard
DO (<0.1)	mg/L	<0.1	-	< 0.5 mg/L			
Temperature	°C		21.97			22.22	
Baro. Press.	mmHg		-			-	

TURBIDITY METER

METER TYPE: Horiba
MODEL NO.: U-52
UNIT ID NO.: Olin

	Units	Standard Value	Meter Value	Standard Value	Meter Value	*Acceptance Criteria (PM)
Standard	NTU	0	0.0	10	0.0	+/- 5% of standard
Standard	NTU	20	-	20	-	
Standard	NTU	100	-	100	-	
Standard	NTU	800	-	800	-	

PHOTOIONIZATION DETECTOR

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Methane	%	50		50	+/- 10% of standard
O_2	%	20.9		20.9	+/- 10% of standard
H_2S	ppmv	25		25	+/- 10% of standard
CO	ppmv	50		50	+/- 10% of standard

OTHER METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

See Notes Below for Additional Information

[X] Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above **(see notes)**.
[ ] Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source:
Lot#/Date Produced:
Trip Blank Source: Lab
Sample Preservatives Source: Lab
Disposable Filter Type: Pine 0.45µm
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L)
- Other
- Other
- Other

	Cal. Standard Lot Number	Exp. Date
pH (4)	Olin-Horiba Auto-Cal Solution	Olin-Horiba Auto-Cal
pH (7)	--	--
pH (10)	--	--
ORP	--	--
Conductivity	--	--
0 Turb. Stan.	Olin-Horiba Cal Set	Olin-Horiba Cal Set
20 Turb. Stan.		
100 Turb. Stan.		
800 Turb. Stan.		
PID Span Gas		
O_2-LEL Span Gas		
DO		

NOTES:

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* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-Field Calibration) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additional acceptance criteria obtained from instrument specific manufacturer recommendations.
** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.
1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-Field Calibration), dated 1/19/2010.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-25	ROUND NO.	3
SAMPLE ID	OC-GW-25	SITE TYPE	Superfund	DATE	8/7/2018
TIME	START 8:25 END 9:10	JOB NUMBER	6107180016	BOTTLE TIME	9:05

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 5.45 FT.

WELL DEPTH (TOR): ~ 12.35 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 5.77 FT.

SCREEN LENGTH: N/A FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.03 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.46 GAL.

0.02
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:30	5.68	140	20.43	0.923	6.31	1.59	11.7	-34	~ 11 ft.	
8:35	5.73	140	18.26	0.963	6.60	1.02	0.10	-125		
8:40	5.77	140	17.57	0.952	6.66	0.91	0.10	-166		
8:45	5.77	140	16.79	0.913	6.58	0.92	0.10	-179		
8:50	5.77	140	16.18	0.889	6.40	0.93	0.10	-175		
9:00	5.77	140	15.94	0.889	6.37	0.94	0.10	-170		
9:05	5.77	140	15.91	0.887	6.36	0.95	0.10	-169		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 125 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 125 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 125 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 250 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.46 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

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WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-78S	ROUND NO.	3
SAMPLE ID	OC-GW-78S	SITE TYPE	Superfund	DATE	8/6/2018
TIME	START 10:20 END 10:50	JOB NUMBER	6107180016	BOTTLE TIME	10:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 4.74 FT.

WELL DEPTH (TOR): ~ 10.35 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.97 FT.

SCREEN LENGTH: 9 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.04 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.91 GAL.

0.04

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:25	4.97	140	22.24	1.38	6.25	5.87	503	-3	~ 9 ft.	
10:30	4.97	140	21.57	1.21	6.31	0.84	395	-11		
10:35	4.97	140	20.84	1.19	6.39	0.35	271	5		
10:40	4.97	140	20.44	1.18	6.43	0.22	263	10		
10:45	4.97	140	20.36	1.18	6.44	0.17	257	12		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.91 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-79S	ROUND NO.	3
SAMPLE ID	OC-GW-79S	SITE TYPE	Superfund	DATE	8/7/2018
TIME	START 10:35 END 11:10	JOB NUMBER	6107180016	BOTTLE TIME	11:00

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 4.61 FT.

WELL DEPTH (TOR): ~ 11.25 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.64 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.17 GAL.

<0.01

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:40	4.64	180	19.51	1.60	6.18	3.48	48.0	-8	~ 9 ft.	
10:45	4.64	180	18.56	1.62	6.18	0.47	42.5	-6		
10:50	4.64	180	18.26	1.63	6.15	0.29	45.6	-8		
10:55	4.64	180	18.15	1.62	6.15	0.20	48.9	-9		
11:00	4.64	180	18.05	1.62	6.14	0.17	53.4	-9		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.17 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-202S	ROUND NO.	3
SAMPLE ID	OC-GW-202S	SITE TYPE	Superfund	DATE	8/6/2018
TIME	START 8:50 END 9:25	JOB NUMBER	6107180016	BOTTLE TIME	9:20

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.72 FT.

WELL DEPTH (TOR): ~ 13.3 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.75 FT.

SCREEN LENGTH: 8 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.40 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8"55	6.75	180	18.47	0.852	6.69	0.59	1.3	105	~ 11 ft.	
9:00	6.75	180	18.18	0.853	6.68	0.55	0.1	109		
9:05	6.75	180	17.57	0.857	6.57	0.43	0.1	124		
9:10	6.75	180	16.81	0.860	6.46	0.23	0.1	138		
9:15	6.75	180	16.78	0.860	6.47	0.22	0.1	139		
9:20	6.75	180	16.88	0.859	6.46	0.21	0.1	140		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.40 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-202D	ROUND NO.	3
SAMPLE ID	OC-GW-202D	SITE TYPE	Superfund	DATE	8/6/2018
TIME	START 9:25 END 10:00	JOB NUMBER	6107180016	BOTTLE TIME	9:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.15 FT.

WELL DEPTH (TOR): ~ 23.7 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.17 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: <0.01

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.40 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:30	6.17	180	19.38	3.49	5.59	1.06	16.8	232	~ 20 ft.	
9:35	6.17	180	19.18	3.54	5.60	0.64	15.8	241		
9:40	6.17	180	18.11	3.59	5.64	0.12	13.1	248		
9:45	6.17	180	17.29	3.56	5.64	0.01	12.2	249		
9:50	6.17	180	17.27	3.54	5.63	0.01	11.8	249		
9:55	6.17	180	17.20	3.54	5.63	0.01	12.3	248		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.40 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-16RRR	ROUND NO.	3
SAMPLE ID	OC-PZ-16RRR	SITE TYPE	Superfund	DATE	8/7/2018
TIME	START 10:15 END 10:35	JOB NUMBER	6107180016	BOTTLE TIME	10:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [ ] TOP OF WELL RISER
- [X] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.79 FT.

WELL DEPTH (TOR): ~ 6 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 0.75 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: 2 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: N/A

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: ~0.1 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:20	---	---	24.11	1.79	6.27	6.87	89.7	-80	~ 6 ft.	
	Well Dry	Sample Recharge								
10:30	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.1 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Well went dry; sample recharge

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-17RRR	ROUND NO.	3
SAMPLE ID	OC-PZ17RRR	SITE TYPE	Superfund	DATE	8/7/2018
TIME	START 9:20 END 10:05	JOB NUMBER	6107180016	BOTTLE TIME	9:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [ ] TOP OF WELL RISER [X] TOP OF PROTECTIVE CASING [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.55 FT.

WELL DEPTH (TOR): ~ 6.65 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 0.75 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: 1 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.1 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

N/A

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:30	---	---	20.99	0.571	6.70	1.98	982	78	~ 6.5 ft.	
	Well Dry	Sample Recharge								
9:45	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.1 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Well went dry; sample recharge

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-18R	ROUND NO.	3
SAMPLE ID	OC-PZ-18R	SITE TYPE	Superfund	DATE	8/7/2018
TIME	START 7:45 END 8:20	JOB NUMBER	6107180016	BOTTLE TIME	8:10

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [ ] TOP OF WELL RISER
- [X] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.01 FT.

WELL DEPTH (TOR): ~ 5.99 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 2.89 FT.

SCREEN LENGTH: 1.6 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: 0.03 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.72 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

0.04

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
7:50	2.81	110	22.90	3.77	6.05	11.02	12.2	-107	~ 5.5 ft.	
7:55	2.84	110	22.05	2.91	6.14	8.24	11.6	-114		
8:00	2.86	110	21.97	2.05	6.23	7.55	11.6	-121		
8:05	2.87	110	21.93	2.08	6.24	7.29	11.5	-122		
8:10	2.89	110	21.92	2.03	6.25	7.19	11.9	-124		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.72 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-24	ROUND NO.	3
SAMPLE ID	OC-PZ-24	SITE TYPE	Superfund	DATE	8/6/2018
TIME	START 7:45 END 8:20	JOB NUMBER	6107180016	BOTTLE TIME	8:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 8.97 FT.

WELL DEPTH (TOR): ~ 17.65 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 9.09 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.94 GAL. | 0.01
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
7:50	9.08	120	24.36	1.85	5.96	9.14	4.0	-11	~ 16 ft.	
7:55	9.09	120	21.63	1.78	6.55	6.53	25.7	-86		
8:00	9.09	120	21.09	1.77	6.69	6.31	32.7	-86		
8:05	9.09	120	20.68	1.77	6.78	6.18	42.0	-87		
8:10	9.09	120	20.14	1.77	6.84	6.10	42.4	-87		
8:15	9.09	120	20.27	1.76	6.87	6.12	43.1	-88		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.94 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-25	ROUND NO.	3
SAMPLE ID	OC-PZ-25	SITE TYPE	Superfund	DATE	8/6/2018
TIME	START 8:20 END 8:50	JOB NUMBER	6107180016	BOTTLE TIME	8:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 8.58 FT.

WELL DEPTH (TOR): ~ 17.75 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 8.59 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.91 GAL.

<0.01

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:25	8.59	140	19.92	1.13	6.70	5.34	4.8	20	~ 15 ft.	
8:30	8.59	140	19.46	1.13	6.73	2.73	6.5	22		
8:35	8.59	140	18.61	1.14	6.78	1.68	12.9	23		
8:40	8.59	140	18.04	1.15	6.80	1.63	12.7	23		
8:45	8.59	140	18.02	1.14	6.81	1.60	13.3	23		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.91 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-16R	ROUND NO.	3
SAMPLE ID	OC-GW-16R	SITE TYPE	Superfund	DATE	8/8/2018
TIME	START 8:15 END 9:00	JOB NUMBER	6107180016	BOTTLE TIME	8:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 12.09 FT.

WELL DEPTH (TOR): ~ 17.2 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 12.70 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.09 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.94 GAL.

0.10

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:20	12.41	140	20.50	0.213	6.05	1.86	51.6	-18	~ 16 ft.	
8:25	12.56	120	20.06	0.193	6.32	0.83	23.5	-36		
8:30	12.67	120	19.68	0.178	6.54	0.48	9.2	-31		
8:35	12.69	120	19.57	0.174	6.71	0.34	4.3	-26		
8:40	12.69	120	19.57	0.172	6.79	0.24	4.7	-21		
8:45	12.70	120	19.52	0.172	6.81	0.22	4.8	-21		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.94 gal.

NOTES

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAI

Checked by: CTM

SIGNATURE: Field Form w/ Signature on File

Appendix B

Chain of Custody Records

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

360325-Boston

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-116093-22977.1
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 2
Company: Olin Corporation		Analysis Requ		Job #:
Address: 51 Eames street	Due Date Requested:			Preservation Codes:
City: Wilmington	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			Other:
Email: beguichard@olin.com	WO #:			
Project Name: Olin Wilmington MA Groundwater Quarterly	Project #: 48006612			
Site: Massachusetts	SSOW#:			

480-140036 COC

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Sulfate/Chloride	350.1 - Ammonia	6010MCP - Field filtered Al/Cr	2510B - Specific Cond.	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	D	N		
OC-GW-202S	8-6-18	9:20	G	Water	✓		1	1	1	1	4	
OC-GW-202D	8-6-18	9:55		Water	✓		1	1	1	1	4	
OC-GW-25	8-7-18	9:10		Water	✓		1	1	1	1	4	
OC-GW-78S	8-6-18	10:45		Water	✓		1	1	1	1	4	
OC-GW-79S	8-7-18	11:10		Water	✓		1	1	1	1	4	
OC-PZ-16RRR	8-7-18	10:30		Water	✓		1	1	1	1	4	
OC-PZ-17RRR	8-7-18	9:45		Water	✓		1	1	1	1	4	
OC-PZ-18R	8-7-18	8:10		Water	✓		1	1	1	1	4	
OC-PZ-24	8-6-18	8:15		Water	✓		1	1	1	1	4	
OC-PZ-25	8-6-18	8:45		Water	✓		1	1	1	1	4	
~~DUP~~				Water	✓							

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		8-7-18			8-7-18 1305	TA
2		8-7-18 1800			8-8-18 0100	TA
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 2.2 #1

Ver: 08/04/2016

8/24/2018

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

360325-Boston

Chain of Custody Record

360325-Boston 360325-Boston

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier:	COC No: 480-116095-22982.1
Client Contact: Mr. Brian Guichard	Phone: 7758586121	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation				Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Wilmington MA Plant B Quarterly May	Project #: 48006612			
Site: Massachusetts	SSOW#:			

480-140124 COC

Analysis Request

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	350.1 - Nitrogen, Ammonia	6010MCP - Fe	MAVPH - MA VPH	8260MCP - 8260 TMPs only	8270_LL_MCP - 8270 NDPA and BEHP only	9040C - pH	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	S	D	A	A	N	N	X	
OC-GW-16R	8-8-18	8:45	G	Water	✓		1	1	3	3	2	1	11	
Trip Blank				Water									4	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	Relinquished by:	8-8-18 1700		Received by:	8-9-18 0700	
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2.0 #1

Ver: 08/04/2016

Appendix B

Data Validation Memoranda
(*Provided on CD*)

Appendix B1

Second Quarter 2018 Sampling Event
Third Quarter 2018 Sampling Event

Appendix B2

Additional Sampling Events
May 2018 Calcium Sulfate Landfill Sampling
June 2018 Private Well Sampling
September 2018 Private Well Sampling

Appendix B3

Unvalidated Data
April 2018 – September 2018
Plant B RGP and Tank Sampling

Appendix C

Weir Monthly Inspection Reports: April 2018 – September 2018

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090
www.woodplc.com

April 26, 2018

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – April 2018
Wood Project No. 6107-18-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of April 2018 are attached. Wood conducted an inspection on Thursday, April 26, 2018.

West Ditch Off-Property

Stations A and B had a normal level of clear water during the first three inspections of the month. During the fourth inspection, Stations A and B had a high level and flow of clear to tannic water with submerged leaves and a brown-rust color stream bottom.

Weir

Station D had a normal level of clear water during the first three inspections of the month. During the fourth and final inspection of the month, Station D had a high level and flow of clear to slightly tannic water with submerged leaves and a brown color stream bottom.

There was moderate flow from the Weir outlet and no flow to low flow from the Plant B outlet during the first three inspections. At the time of the fourth inspection, there was a high level and flow of clear water from Plant B and Weir outlets. The main area was clear with signs of algae growth noted along the stream bed for the first three inspections. There was a high level and flow of clear water, trace foaming, submerged leaves, and an orange-rust color stream bottom observed during the fourth and final inspection of the month.

South Ditch Downstream of the Weir

Stations E and F had a moderate flow of clear water during the first three inspections of the month. For the fourth and final inspection of the month, Stations E and F in the South Ditch had a high level and flow of clear water with some foaming and an orange-rust to brown color stream bottom. Station G had a moderate flow of clear water during the first three inspections of the month. During the fourth inspection, Station G was flooded with a high level and flow of clear water with submerged leaves, and a brown-rust color was observed on the stream bottom.

The hay bale line had a moderate flow of clear water observed during the first three inspections of the month. A high level and flow of clear water with some foaming and a brown stream bottom were observed during the fourth and final inspection of the month.

Wetland Areas South of the South Ditch

Stations H and I had standing water during the first three inspections of the month. During the final inspection of the month, Stations H and I were flooded with a medium to high level and flow of clear water with slight foaming noted at Station I.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
[P:\old_Wakefield_Data\projects\OLIN\Wilmington\South Ditch\Monthly Inspections\2018\2018_04\cjc April 2018.docx]

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 4/6/2018 Time 10:15 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a moderate flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a moderate flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a moderate flow from the weir and no flow from the outlet pipe. The main area is clear. The walking path is mud and covered with numerous fallen trees.

The Hay Bale line had a medium flow of clear water.

Re-attach the pipe riser inside the retention pond.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 4/13/2018 Time 11:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a moderate flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a moderate flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a moderate flow from the weir and a low flow from the outlet pipe. The main area is clear with signs of algae growth in the main area and along the stream bed.

The Hay Bale line had a moderate flow of clear water.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Inspection Report

Date 4/20/2018 **Time** 10:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a moderate flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a moderate flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a moderate flow from the weir and a moderate flow from the outlet pipe. The main area is clear with signs of algae growth in the main area and along the stream bed but seems to be slightly less abundant than last week.

The Hay Bale line has a moderate flow of clear water.

Began the removal of some of the fallen trees and branches along the walking trail.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 4/26/2018 **Time:** 9:45 **Inspectors:** Chris Mazzolini

~60°F; Overcast

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: High level and flow of clear to tannic water; w/ leaves and a brown-rust bottom
	Station B		**X**	B: High level and flow of clear to tannic water; leaves observed on the stream bottom
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D		**X**	D: High level and flow of clear to tannic water w/ leaves and a brown stream bottom
Weir - Downstream				
	Station E		**X**	E: High level and flow of clear water w/ an orange-rust bottom and foaming
	Station F		**X**	F: High level and flow of clear water w/ a brown-rust bottom and foaming
	Station G		**X**	G: Flooded w/ saturated soil. High level and flow of clear water w/ a brown-rust stream bottom and leaves observed
Unnamed Ditch				
	Station H		**X**	H: Flooded, high level and flow of clear water w/ slight foaming noted
	Station I		**X**	I: Flooded, medium to high level and flow of clear water
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a high level and flow of clear water from the Plant B Outlet and Weir Outlet pipe.

The Main Area: High level and flow of clear water w/ trace foaming; leaves and an orange-rust color were observed on the bottom.

The Hay Bale Line: High level and flow of clear water w/ a brown bottom and some foaming.

Animal tracks observed on the trails.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090
www.woodplc.com

May 24, 2018

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – May 2018
Wood Project No. 6107-18-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of May 2018 are attached. Wood conducted an inspection on Thursday, May 24, 2018.

West Ditch Off-Property

Stations A and B had low to high levels of clear water during the first three inspections of the month. During the fourth and final inspection, Stations A and B had a medium to high level and medium to low flow of clear to tannic water with submerged leaves observed on the stream bottom.

Weir

Station D had a normal to elevated level of clear water during the first three inspections of the month. During the fourth inspection, Station D had a high level and medium flow of clear to slightly tannic water; with floating leaves and a brown-rust color noted on the stream bottom.

There was a low to high flow from the Weir outlet and low to moderate flow from the Plant B outlet during the first three inspections. During the fourth inspection there was a moderate level and flow of clear water from the Weir outlet and Plant B outlet. The main area was clear with signs of algae growth noted along the stream bed for the first three inspections. There was a high level and flow of clear water, floating green algae, submerged leaves, and an orange-rust color stream bottom observed during the fourth and final inspection of the month.

South Ditch Downstream of the Weir

Stations E and F had a moderate to high flow of clear water during the first three inspections of the month. For the fourth and final inspection of the month, Stations E and F had a high level and flow of clear water with an orange-rust color stream bottom. Station G had a moderate to high flow of clear water during the first three inspections of the month. For the fourth inspection, Station G was flooded with a high level and flow of clear water and had an orange-rust color stream bottom.

The hay bale line had a moderate to high flow of clear water observed during the first three inspections of the month. For the fourth and final inspection of the month, a high level and flow of clear water, some foaming, and a rust color stream bottom was observed.

Wetland Areas South of the South Ditch

Stations H and I had standing water during the first three inspections of the month. For the fourth and final inspection, Stations H and I were flooded with clear water, had some green algae, and low to no flow (respectively).

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
[P:\old_Wakefield_Data\projects\OLIN\Wilmington\South Ditch\Monthly Inspections\2018\2018-05\May 2018.docx]

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 5/4/2018 **Time** 10:15 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a moderate flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a moderate flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a moderate flow from the weir and a low flow from the outlet pipe. The main area is clear with signs of algae growth in the main area and along the stream bed.

The Hay Bale line has a moderate flow of clear water.

Noticed several locations of canine scat along the walking trail.

Picked up 5 ticks on the walk.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 5/11/2018 **Time** 10:15 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a moderate flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a moderate flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a low flow from the weir and a moderate flow from the outlet pipe. The main area is clear with signs of algae growth in the main area and along the stream bed. Foliage is in near full bloom.

The Hay Bale line has a moderate flow of clear water.

Noticed 2 deer by the foot bridge.

Picked up 4 ticks on the walk.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 5/18/2018 Time 9:00 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a high level of clear water.
	Station A		x	Stn B has a high level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a elevated level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a high flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a high flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a high flow from the weir and a moderate flow from the outlet pipe. The main area is clear with signs of algae growth in the main area and along the stream bed. The stream has a high flow of clear water. Foliage is in full bloom.

The Hay Bale line has a high flow of clear water.

Picked up 5 ticks on the walk.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 5/24/2018 **Time:** 13:30 **Inspectors:** Shawna Iacozzi

~80°F; Sunny

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: Med. level and low flow of clear to tannic water w/ leaves on the bottom
	Station B		**X**	B: High level and med. to low flow of clear to tannic water
				with leaves observed on the bottom
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D		**X**	D: High level and med. flow of clear to tannic water w/ leaves and a
				brown-rust bottom
Weir - Downstream				
	Station E		**X**	E: High level and flow of clear water w/ an orange-rust bottom
	Station F		**X**	F: High level and flow of clear water w/ an orange-rust bottom
	Station G		**X**	G: Flooded w/ saturated soil. High level and medium flow of clear water w/
				an orange-rust stream bottom
Unnamed Ditch				
	Station H		**X**	H: Flooded, low level and flow of clear water w/ green algae noted
	Station I		**X**	I: Flooded, medium level of clear water, no flow; green algae noted
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a med. level and flow of clear water from the Plant B Outlet and Weir Outlet pipe.

The Main Area: High level and flow of clear water w/ floating green algae, leaves and an orange-rust color were observed on the bottom.

The Hay Bale Line: High level and flow of clear water w/ a rust bottom and trace foaming.

Animal tracks observed on the trails.

Frogs and tadpoles observed.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090
www.woodplc.com

June 29, 2018

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – June 2018
Wood Project No. 6107-18-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of June 2018 are attached. Wood conducted an inspection on Friday, June 29, 2018.

West Ditch Off-Property

Stations A and B had a normal level of clear water during the first two inspections of the month and a low level of clear water during the last two inspections of the month. During the fifth inspection, Stations A and B had a medium level and low flow of tannic water with submerged leaves and a brown-rust color stream bottom.

Weir

Station D had a normal level of clear water during the first two inspections of the month a low level of clear water during the last two inspections of the month. During the fifth and final inspection of the month, Station D had a medium level and flow of clear to slightly tannic water with submerged leaves and a brown color stream bottom.

There was moderate flow from the Weir outlet and low flow from the Plant B outlet during the first inspections. During the second, third and fourth inspections there was low to no flow from the Weir and the Plant B outlet pipe. At the time of the fifth inspection, there was a medium level and flow of clear water from the Weir outlet and no flow from from the Plant B outlet. . The main area was clear with signs of algae growth noted along the stream bed for the first three inspections. There was a medium level and flow of clear water, with some green algae, trace foaming, submerged leaves, and an orange-rust color stream bottom observed during the fourth and final inspection of the month.

South Ditch Downstream of the Weir

Stations E and F had a moderate flow of clear water during the first and fifth inspections of the month. For the second, third and fourth inspection of the month, Stations E and F in the South Ditch had a low level and flow of clear water. During the fifth and final inspection some foaming and an orange-rust to brown color stream bottom was noted. Station G had a moderate flow of

clear water during the first inspection of the month. During the remaining four inspections, Station G had a low level and flow of clear water with submerged leaves, and a brown-rust color was observed on the stream bottom during the fifth and final inspection.

The hay bale line had a moderate flow of clear water observed during the first inspection of the month. A very low flow of clear water was observed during the second, third and fourth inspections. A medium level and flow of clear water with some foaming and a brown stream bottom were observed during the fifth and final inspection of the month.

Wetland Areas South of the South Ditch

Stations H and I had standing water during the first inspection of the month. During the second, third and fourth inspections, both stations had saturated soil. During the fifth and final inspection of the month, Station H had a medium level and flow of clear water with trace foam, and station I was flooded with clear standing water, with some green algae noted.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
[P:\old_Wakefield_Data\projects\OLIN\Wilmington\South Ditch\Monthly Inspections\2018\2018-06\June 2018.docx]

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 6/1/2018 **Time** 11:00 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a moderate flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a moderate flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a moderate flow from the weir and a low flow from the outlet pipe. The main area is clear with signs of algae growth in the main area and along the stream bed. The stream has a moderate flow of clear water.

The Hay Bale line has a moderate flow of clear water.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 6/8/2018 **Time** 10:45 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a low flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a low flow of clear water.
Unnamed Ditch				Stn H has saturated soil.
	Station H		x	Stn I has saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and a low flow from the outlet pipe. The main area is clear. The stream has a low flow of clear water with some light foaming at the check dams.

The Hay Bale line has a trickle flow of clear water.

picked up 3 ticks during the walk and there is an excessive amount of mosquitos and flies.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 6/15/2018 **Time** 3:00:00 A **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a low flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a low flow of clear water.
Unnamed Ditch				Stn H has saturated soil.
	Station H		x	Stn I has saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a low flow from the weir and no flow from the outlet pipe. The main area is clear with some light scum on the water surface. The stream has a low flow of clear water with some ligh foaming at the check dams.

The Hay Bale line has a trickle flow of clear water.

picked up 4 ticks during the walk and saw lots of canine and deer prints in the mud along the trail.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 6/22/2018 **Time** 11:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water. Noticed several
	Station D	x		frogs and one snake in the area.
Weir - Downstream				Stations E & F have a low flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a low flow of clear water.
Unnamed Ditch				Stn H has saturated soil.
	Station H		x	Stn I has saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and a trickle flow from the outlet pipe. The main area is clear with some light scum on the water surface. The stream has a trickle flow of clear water.

The Hay Bale line has a trickle flow of clear water.

Picked up 4 ticks.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 6/29/2018 **Time:** 11:50 **Inspectors:** Chris Mazzolini

~88°F; Sunny, hot, humid

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: Med./low level and flow of clear to tannic water w/ leaves on the bottom
	Station B		**X**	B: Med./low level and flow of clear to tannic water w/ leaves on the bottom
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D	**X**		D: Med. level and flow of clear to tannic water w/ leaves on the bottom and a brown bottom
Weir - Downstream				
	Station E		**X**	E: Med. level and flow of clear water w/ brown-rust bottom and some foaming
	Station F		**X**	F: Med. level and flow of clear water w/ brown-rust bottom and some foaming
	Station G		**X**	G: Overgrown, med./low level and flow of clear water w/ brown stream bottom
Unnamed Ditch				
	Station H		**X**	H: Medium level and flow of clear water w/ trace foam
	Station I		**X**	I: Flooded, clear standing water, no flow, with some green algae
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a medium level and flow of clear water from the Weir Outlet. No flow from the Plant B Outlet.

The Main Area: Medium level and flow of clear water some green algae, foaming, and a brown-rust color was observed on the bottom.

The Hay Bale Line: Medium level and flow of clear water w/ a brown bottom and trace foaming.

Some frogs and tadpoles observed.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090
www.woodplc.com

July 25, 2018

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – July 2018
Wood Project No. 6107-18-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of July 2018 are attached. Wood conducted an inspection on Wednesday, July 25, 2018.

West Ditch Off-Property

Stations A and B had a low level of clear water during the first three inspections of the month. During the fourth inspection, Stations A and B had a high level and flow of clear to tannic water with submerged leaves and a brown-rust color stream bottom.

Weir

Station D had a low level of clear to tannic water during the first three inspections of the month. During the fourth and final inspection of the month, Station D had a high level and low flow of clear to slightly tannic water with submerged leaves and a brown color stream bottom.

There was no flow from the Weir outlet or from the Plant B outlet during the first two inspections. At the time of the third inspection, there was a low level and flow of clear water from Plant B and Weir outlets. At the time of the fourth and final inspection, there was a low level and flow of clear water from the Weir outlet and no flow from the Plant B outlet. The main area had a low level and flow of clear water with signs of algae growth noted along the stream bed for the first three inspections. There was a moderate level and flow of clear water, with algae growth, and an orange-rust color stream bottom observed during the fourth and final inspection of the month.

South Ditch Downstream of the Weir

Stations E and F had a low flow of clear water during the first three inspections of the month. For the fourth and final inspection of the month, Station E in the South Ditch had a medium level and flow of clear water with an orange-rust to brown color stream bottom. At the time of the fourth inspection Station F had a low level and flow of clear water with an orange-rust brown color stream bottom. Station G had a low to very level and flow of clear water during all four inspections of the month. During the fourth inspection, a brown-rust color was observed on the stream bottom.

The hay bale line had no flow during the first two inspections of the month. A low level and flow of clear water with and a brown stream bottom was observed during the third and fourth inspections of the month.

Wetland Areas South of the South Ditch

Stations H and I had saturated soil during the first, third and fourth inspections of the month. During the second inspection Station H was dry and Station I had soft soil.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
[P:\old_Wakefield_Data\projects\OLIN\Wilmington\South Ditch\Monthly Inspections\2018\2018-07\July 2018.docx]

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 7/6/2018 **Time** 10:00 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a low flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a low flow of clear water.
Unnamed Ditch				Stn H has saturated soil.
	Station H		x	Stn I has saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and no flow from the outlet pipe. The main area is low with some light scum on the water surface. The stream has no flow.

The Hay Bale line has no flow.

Picked up 8 ticks.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 7/13/2018 **Time** 10:00 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of tannic colored water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of tannic colored water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H is dry.
	Station H		x	Stn I has soft soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and no flow from the outlet pipe. The main area is low with some light scum on the water surface. The stream has no flow and is very low, almost dry.

The Hay Bale line has no flow.

Picked up 7 ticks and noticed canine scat on the trail in several locations.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 7/20/2018 **Time** 0:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a low flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a low flow of clear water.
Unnamed Ditch				Stn H is saturated soil.
	Station H		x	Stn I has saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a low flow from the weir and a low flow from the outlet pipe. The main area is clear. The stream has a low flow with some light foaming at the check dams.

The Hay Bale line has a low flow of clear water.

Picked up 4 ticks and saw one fox on the footbridge.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 7/25/2018 **Time:** 13:30 **Inspectors:** Shawna Iacozzi

~88°F; Sunny, hot, humid

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: High level of tannic/cloudy water w/leaves on the bottom
	Station B		**X**	B: Similar to Station A, baby ducks noted
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D	**X**		D: High level with little to no flow of clear to tannic water w/ leaves noted and a brown bottom
Weir - Downstream				
	Station E		**X**	E: Med. level and low flow of clear water w/ brown-rust bottom, mucky, frogs
	Station F		**X**	F: Low level and flow of clear water w/ brown-rust bottom
	Station G		**X**	G: Very low water level, slight flow, clear water with brown bottom
Unnamed Ditch				
	Station H		**X**	H: Saturated soil
	Station I		**X**	I: Moist, slightly saturated soil
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a low level and flow of clear water from the Weir Outlet. No flow from the Plant B Outlet.

The Main Area: Medium level and flow of clear water, some green algae, and a brown-rust color was observed on the bottom.

The Hay Bale Line: Low level and flow of clear water w/ a brown bottom.

Wood Environment & Infrastructure Solutions, Inc.
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T: 978-692-9090
www.woodplc.com

August 31, 2018

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – August 2018
Wood Project No. 6107-18-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of August 2018 are attached. Wood conducted an inspection on Friday, August 31, 2018.

West Ditch Off-Property

Stations A and B had a low level of clear water during the first four inspections of the month and a normal level of clear water with no flow with submerged leaves and a brown-rust color stream bottom during the fifth and final inspection of the month.

Weir

Station D had a low level of clear water during the first four inspections of the month. During the fifth and final inspection of the month, Station D had a high level of clear water with submerged leaves and a brown color stream bottom. Some foam was also noted during the fifth inspection of the month.

There was no flow from the Weir or Plant B outlets during the first two inspections. During the third, fourth and fifth inspections there was very low flow from the Weir and no flow from the Plant B outlet pipe. The main area was mostly clear for all five inspections, with pools of standing water but little to no flow noted during the first four inspections. There was a low level of water noted during the fifth and final inspection.

South Ditch Downstream of the Weir

Stations E and F had no flow during the first and second inspections of the month. For the third and fourth inspection of the month, Stations E and F in the South Ditch had a very low level and flow of clear water. During the fifth and final inspection Stations E and F had a low level and flow of clear water, with submerged leaves and a brown-rust color observed on the stream bottom. Station G had no flow the first, second and fifth inspections of the month. During the third and fourth inspections, Station G had a very low level and flow of clear water.

The hay bale line had no flow during the first two inspections of the month. A very low flow of clear water was observed during the third, fourth and fifth inspections.

Wetland Areas South of the South Ditch

Stations H and I were dry during the first two inspections of the month. During the third, and fourth inspections, both stations had saturated soil. During the fifth and final inspection of the month, Station H had saturated soil while Station I was dry.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
[P:\old_Wakefield_Data\projects\OLIN\Wilmington\South Ditch\Monthly Inspections\2018\2018-08\August 2018.docx]

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 8/3/2018 **Time** 12:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have no flow.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has no flow.
Unnamed Ditch				Stn H is dry.
	Station H		x	Stn I is dry.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream has some pools of standing water but no flow.

The Hay Bale line has no flow.

Picked up 7 ticks.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 8/10/2018 **Time** 10:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have no flow.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has no flow.
Unnamed Ditch				Stn H is dry.
	Station H		x	Stn I is dry.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream is mostly dry with some pools of standing water.

The Hay Bale line has no flow.

Picked up 3 ticks.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 8/17/2018 **Time** 10:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H is saturated soil.
	Station H		x	Stn I is saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream has a trickle flow of clear water.

The Hay Bale line has a trickle flow.

Picked up 2 ticks.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Inspection Report

Date 8/24/2018 **Time** 8:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H is saturated soil.
	Station H		x	Stn I is saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream has a trickle flow of clear water.

The Hay Bale line has a trickle flow.

Picked up 4 ticks.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 8/31/2018 **Time:** 10:20 **Inspectors:** Shawna Iacozzi

~80°F; Sunny, hot, humid

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A and B: Normal level of clear water, no flow, organic sheen noted,
	Station B		**X**	submerged leaves, and frogs observed
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D	**X**		D: High level of clear water, no flow, w/ floating leaves, and a brown foam
Weir - Downstream				
	Station E		**X**	E: Low level and flow of clear water w/ brown-rust bottom, muck and frogs
	Station F		**X**	F: Low level and flow of clear water w/ brown-rust bottom
	Station G		**X**	G: Standing water with saturated soil
Unnamed Ditch				
	Station H		**X**	H: Saturated soil, no water
	Station I		**X**	I: Dry
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a very low level and flow of clear water from the Weir Outlet. No flow from the Plant B Outlet.

The Main Area: Low level and very low flow of clear water, a brown-rust color was observed on the bottom.

The Hay Bale Line: Very low level and flow of clear water w/ a brown bottom.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
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T: 978-692-9090
www.woodplc.com

September 28, 2018

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – September 2018
Wood Project No. 6107-18-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of September 2018 are attached. Wood conducted an inspection on Friday, September 28, 2018.

West Ditch Off-Property

Station A had a low level of clear water during all four inspections of the month. Station B had a low level of clear water during the first two inspections of the month and a normal level of clear water during the third and fourth inspection of the month.

Weir

Station D had a low level of clear water during the first three inspections of the month. During the fourth and final inspection of the month, Station D had a normal level and low flow of clear water with submerged leaves and a brown color stream bottom.

There was a very low flow of clear water from the Weir outlet and a low flow from the Plant B outlet during the first and third inspections of the month. There was no flow from either outlet during the second inspection of the month. At the time of the fourth and final inspection of the month there was low flow of clear water from the Weir outlet and no flow from the Plant B outlet. The main area had a low level and flow of clear water during all four inspections.

South Ditch Downstream of the Weir

Stations E and F had a very low flow of clear water during the first two inspections of the month. There was a low level and flow of clear water during the third inspection of the month. For the fourth and final inspection of the month, Stations E & F in the South Ditch had a normal level and flow of clear water with an orange-rust to brown color stream bottom. Station G had a very low level and flow of clear water during all four inspections of the month. During the fourth inspection, a brown-rust color was observed on the stream bottom.

The hay bale line had a very low flow of clear water during the three inspections of the month. A low level and flow of clear water with and a brown stream bottom was observed during the fourth inspection of the month.

Wetland Areas South of the South Ditch

During the first three inspections of the month Stations H & I had some standing water. During the fourth and final inspection of the month Station H consisted of saturated ground while Station I was flooded.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
[P:\old_Wakefield_Data\projects\OLIN\Wilmington\South Ditch\Monthly Inspections\2018\2018-09\September 2018.docx]

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 9/7/2018 **Time** 11:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H has some stading water.
	Station H		x	Stn I has some standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and a low flow from the outlet pipe. The main area is mostly clear and is about 50% covered with white scum. The stream has a low flow of clear water.

The Hay Bale line has a trickle flow.

Noticed what was either a young coyote or a fox near the foot bridge.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 9/14/2018 **Time** 1:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H has some stading water.
	Station H		x	Stn I has some standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream has a trickle flow of clear water. Vegetation is beginning to die for the winter season.

The Hay Bale line has a trickle flow.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 9/20/2018 **Time** 8:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a low of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H has some stading water.
	Station H		x	Stn I has some standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and a low flow from the outlet pipe. The main area is mostly clear. The stream has a low flow of clear water.

The walking trail is extremely muddy and has multiple animal trails throughout.

The Hay Bale line has a trickle flow.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 9/28/2018 **Time:** 12:30 **Inspectors:** Shawna Iacozzi

~65°F; light rain

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: Low level of clear water, no flow, submerged leaves
	Station B		**X**	B: Normal level of clear water, no flow, submerged leaves, frogs
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D	**X**		D: Normal level of clear water w/ submerged leaves and a rust orange bottom
Weir - Downstream				
	Station E		**X**	E: Normal level and flow of clear water w/ a brown-rust bottom
	Station F		**X**	F: Normal level and flow of clear water w/ a brown-rust bottom
	Station G		**X**	G: Very low flow of clear water
Unnamed Ditch				
	Station H		**X**	H: Saturated soil, some standing water
	Station I		**X**	I: Flooded
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a low level and flow of clear water from the Weir Outlet. No flow from the Plant B Outlet.

The Main Area: Low level and flow of clear water, a brown-rust color was observed on the bottom.

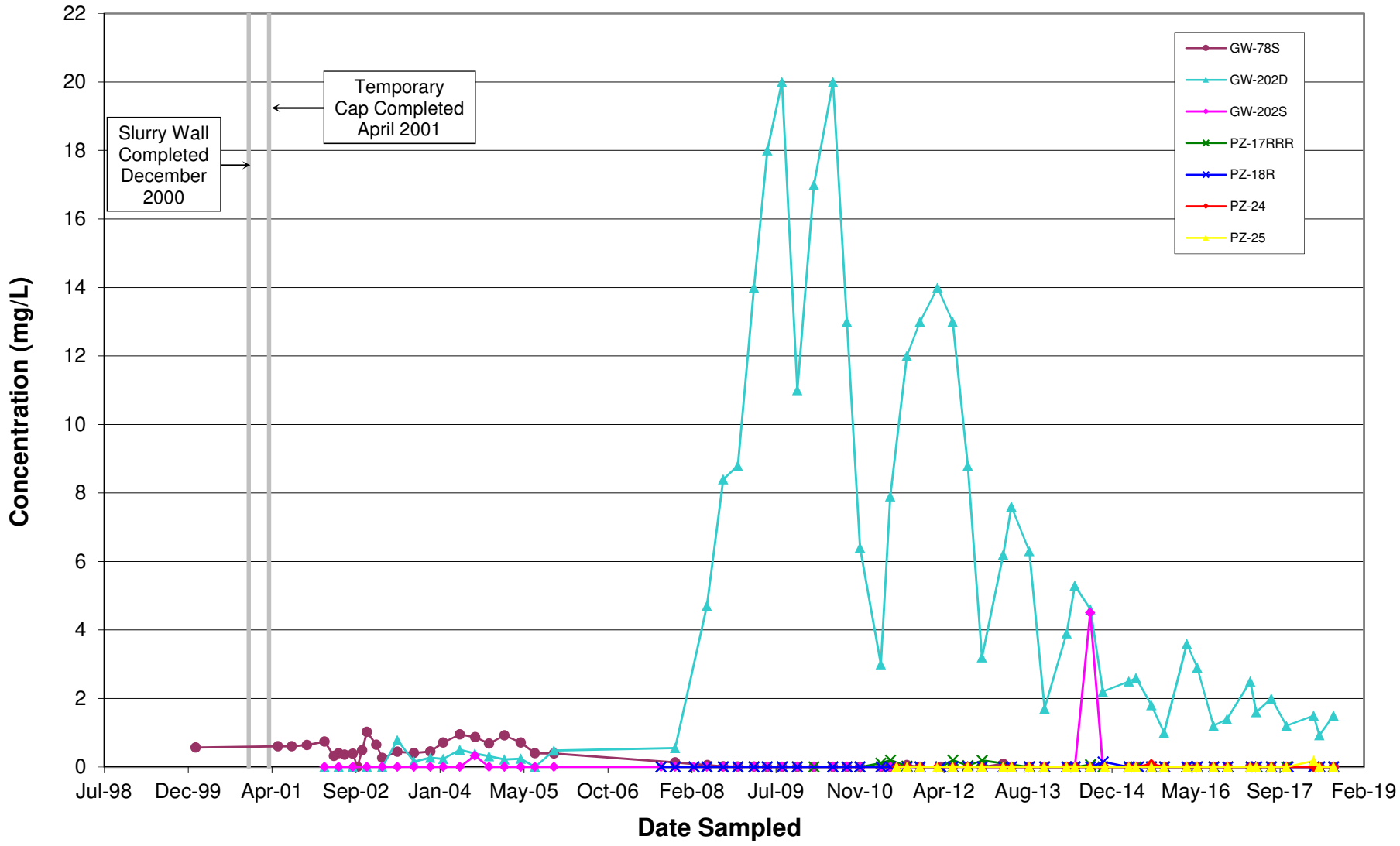
The Hay Bale Line: Low level and flow of clear water w/ a brown bottom.

Appendix D

Slurry Wall/Cap Groundwater and
Surface Water Time Series Plots

Appendix D1

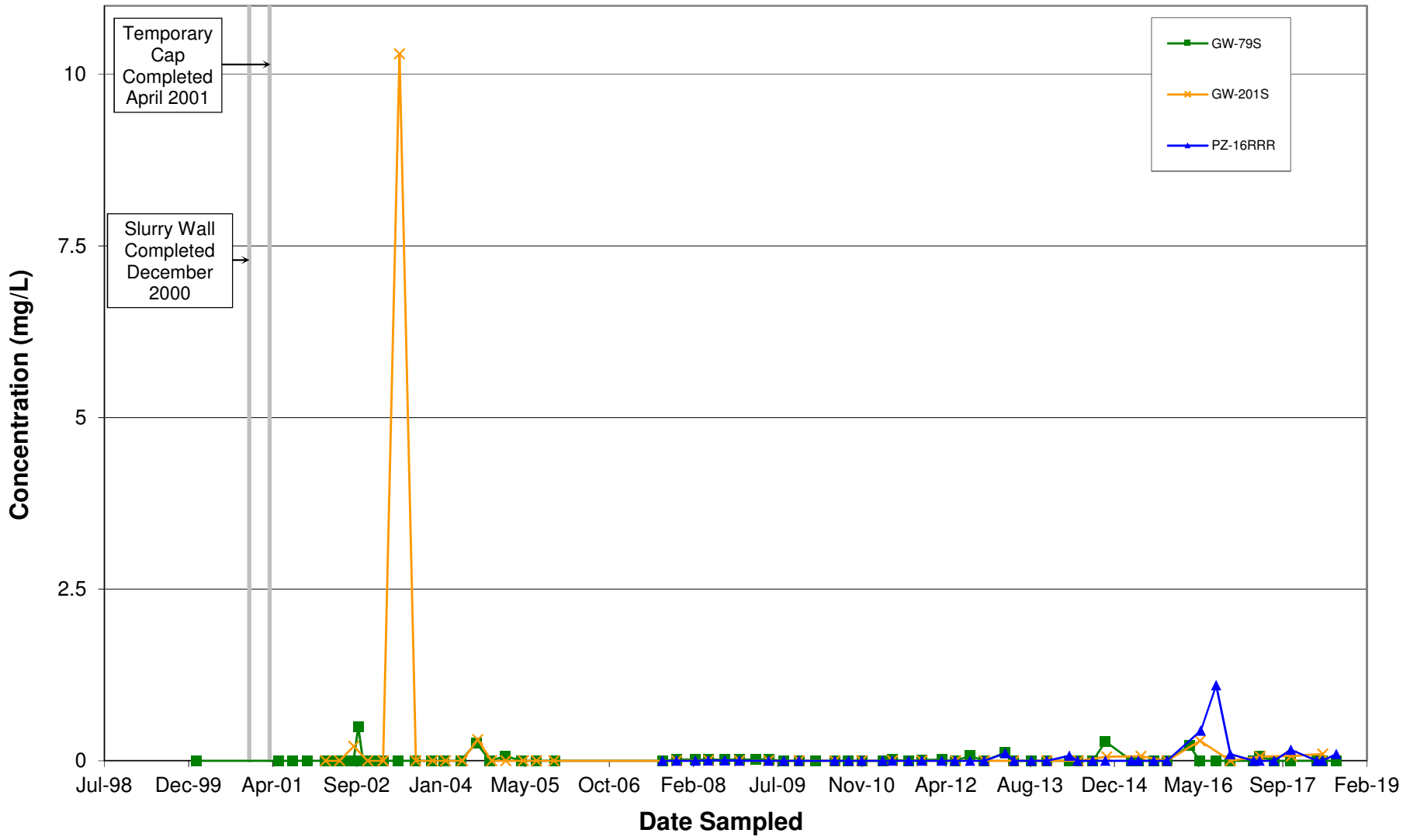
Groundwater
(Aluminum, Ammonia, Chloride, Chromium, Sulfate)



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Aluminum in Groundwater South of Containment Structure Figure D-1.1

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Aluminum GW S

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

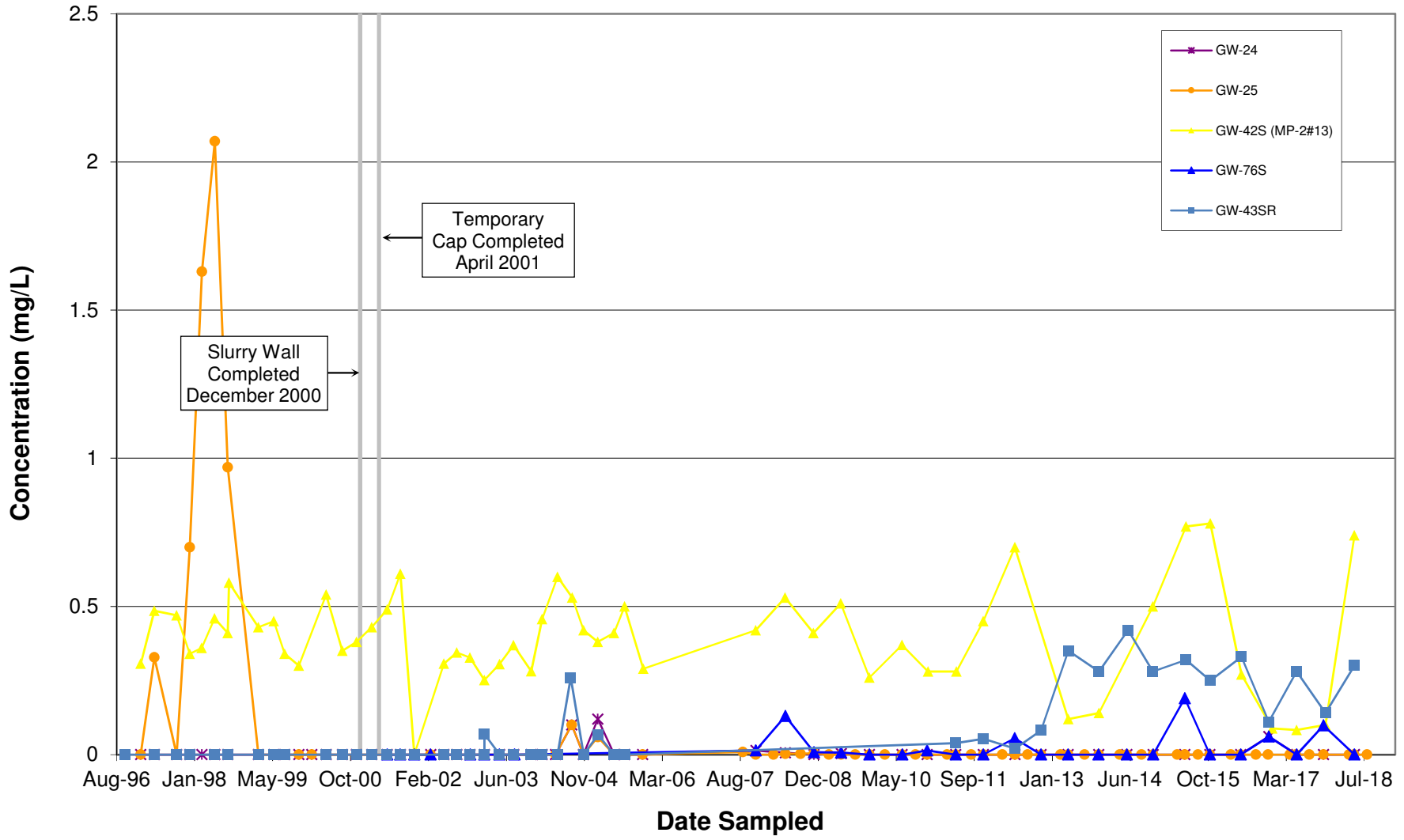
wood.

Filtered Aluminum in Groundwater
Southeast of Containment Structure

Figure D-1.2

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Aluminum GW SE

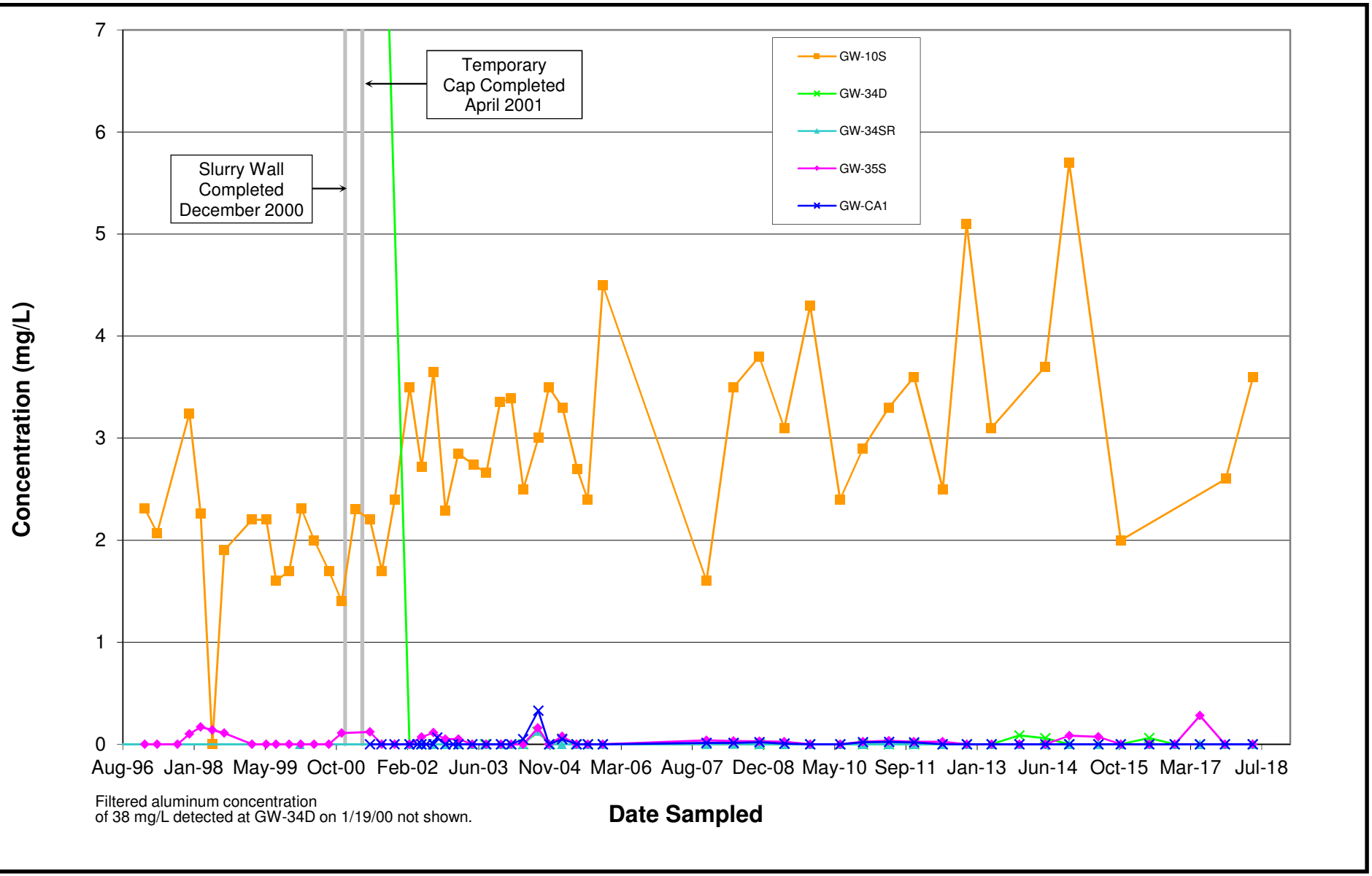
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Aluminum in Groundwater West of Containment Structure Figure D-1.3

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Aluminum GW W

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018

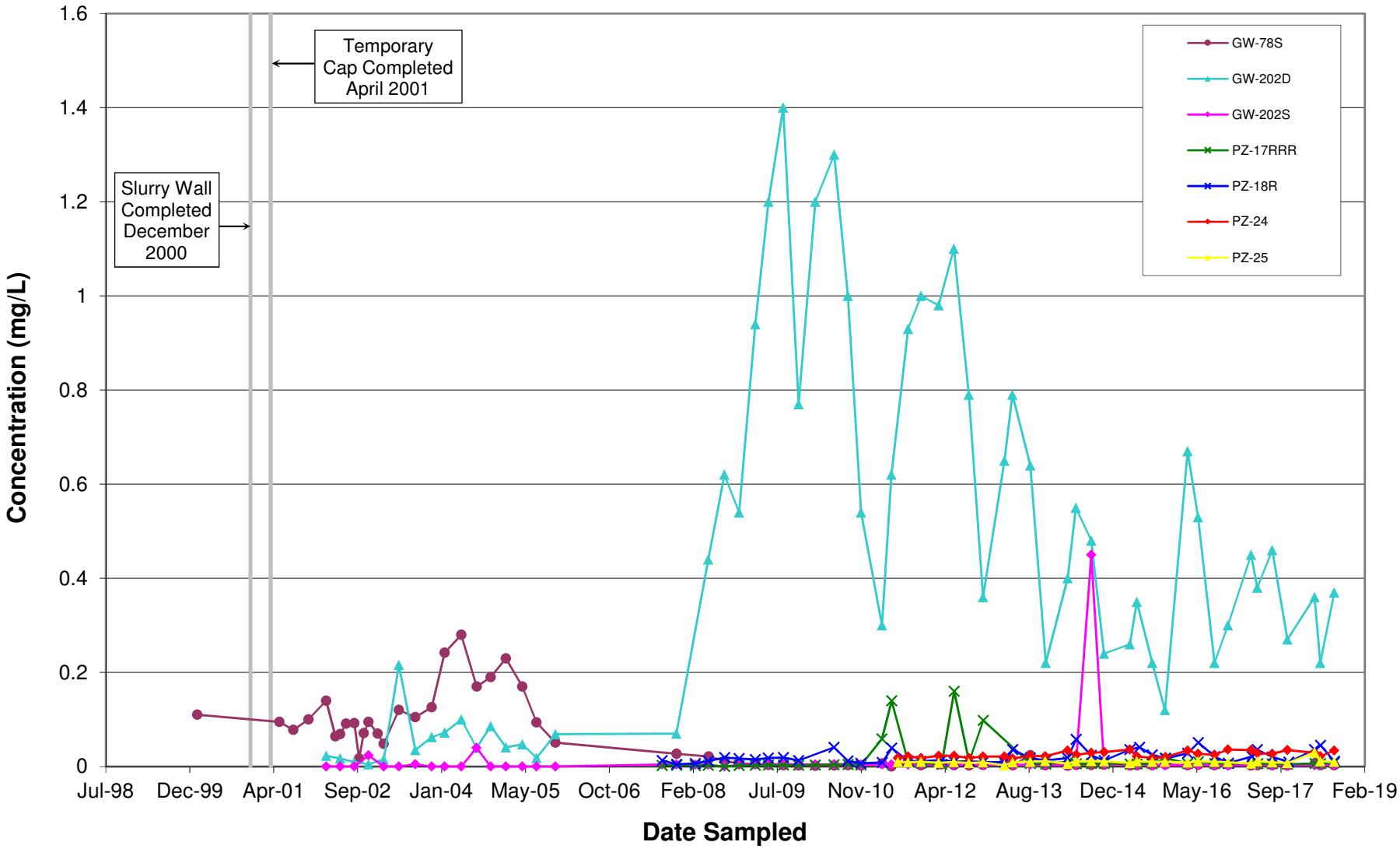


Filtered aluminum concentration
of 38 mg/L detected at GW-34D on 1/19/00 not shown.

Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Aluminum in Groundwater North of Containment Structure Figure D-1.4

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Aluminum GW N

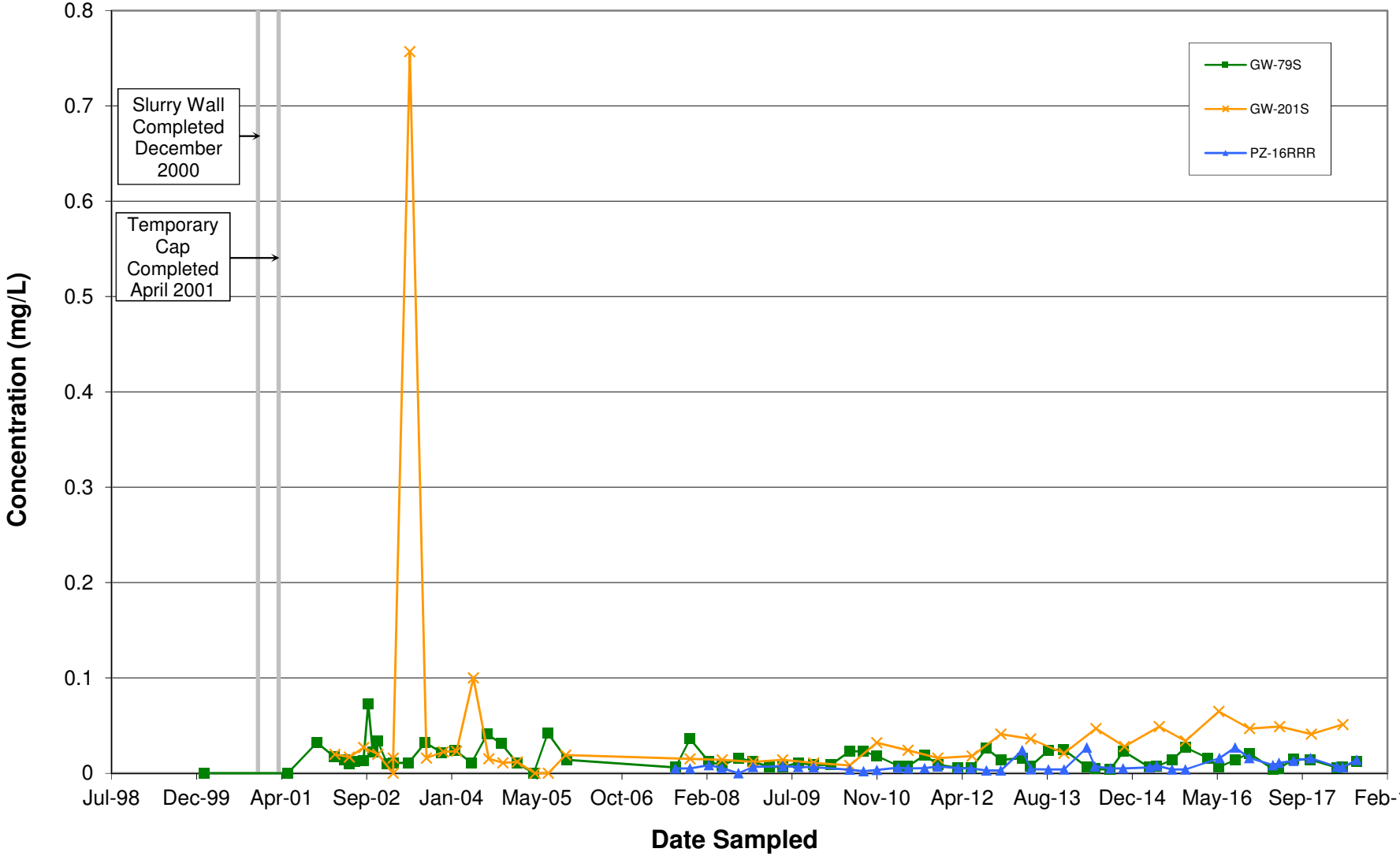
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Chromium in Groundwater South of Containment Structure Figure D-1.5

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium GW S

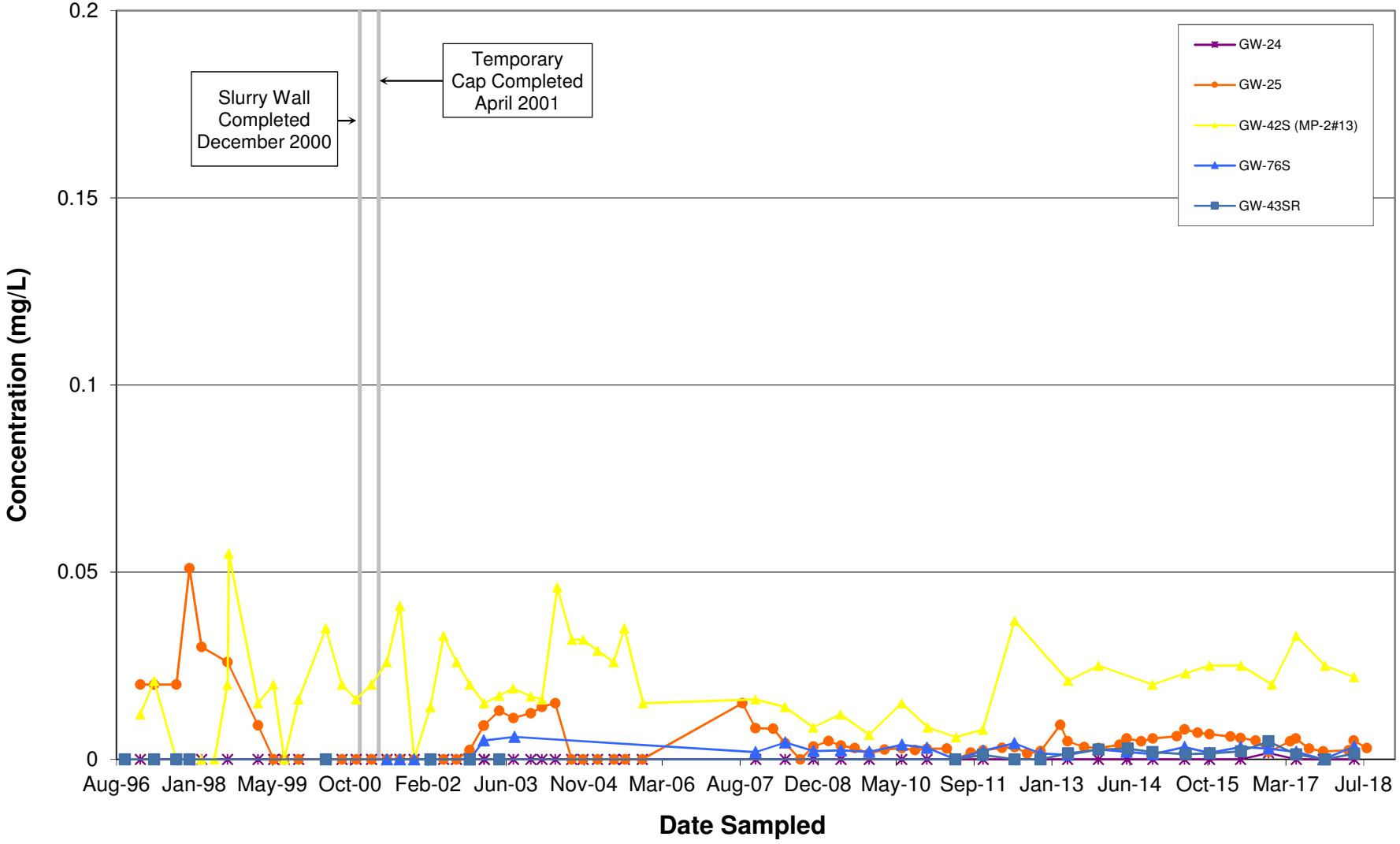
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Chromium in Groundwater Southeast of Containment Structure Figure D-1.6

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium GW SE

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

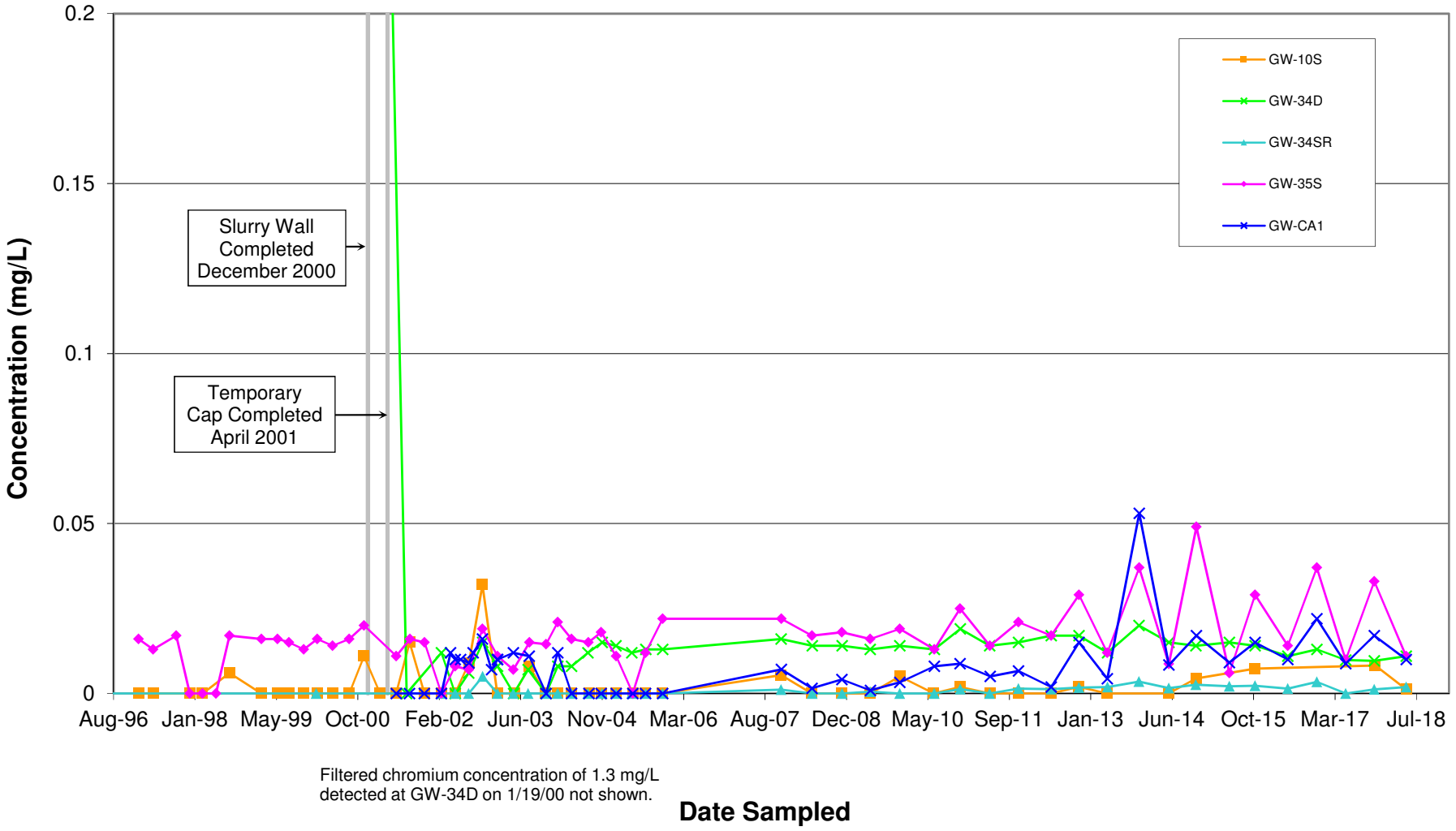
wood.

Filtered Chromium in Groundwater
West of Containment Structure

Figure D-1.7

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium GW W

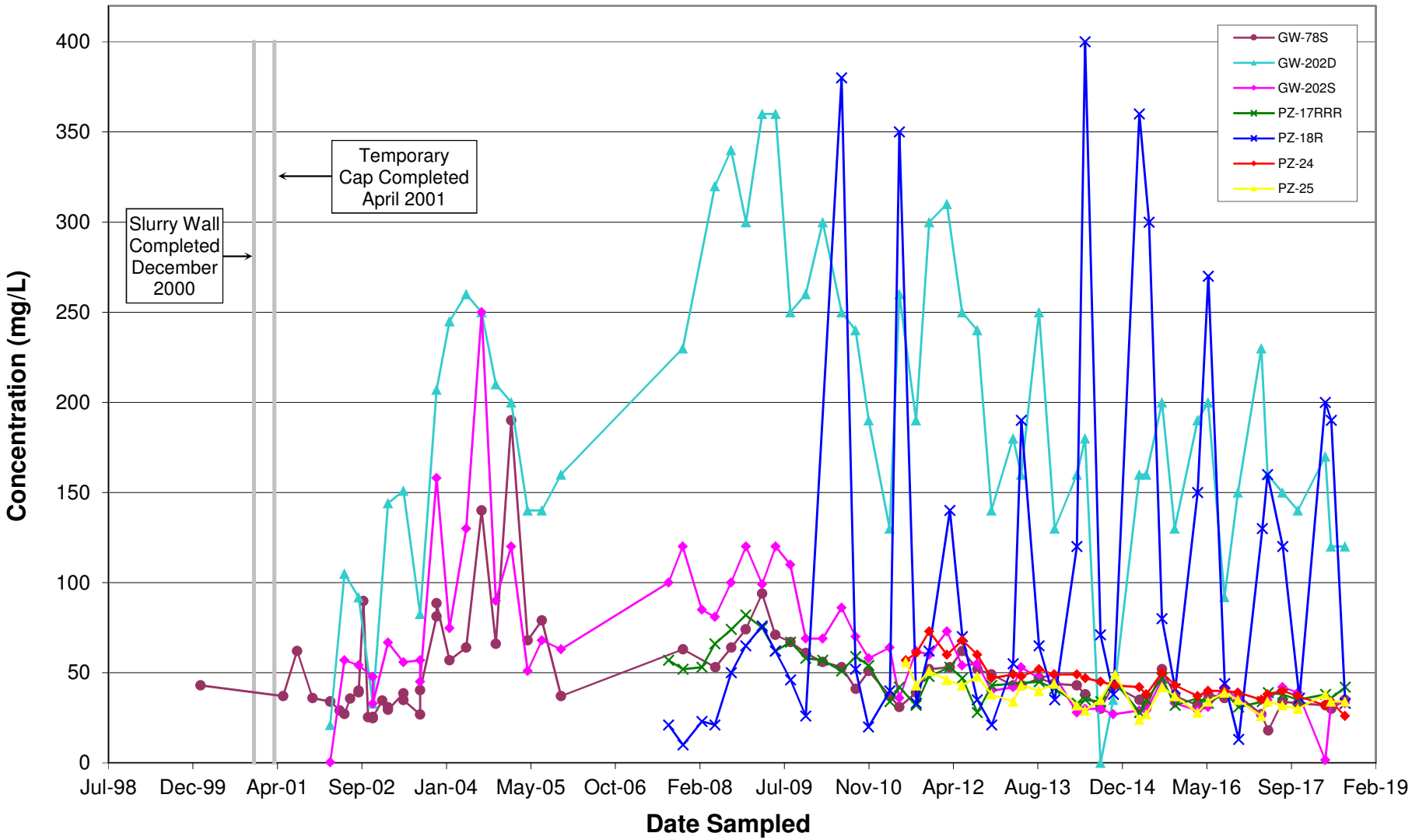
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Chromium in Groundwater North of Containment Structure Figure D-1.8

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium GW N

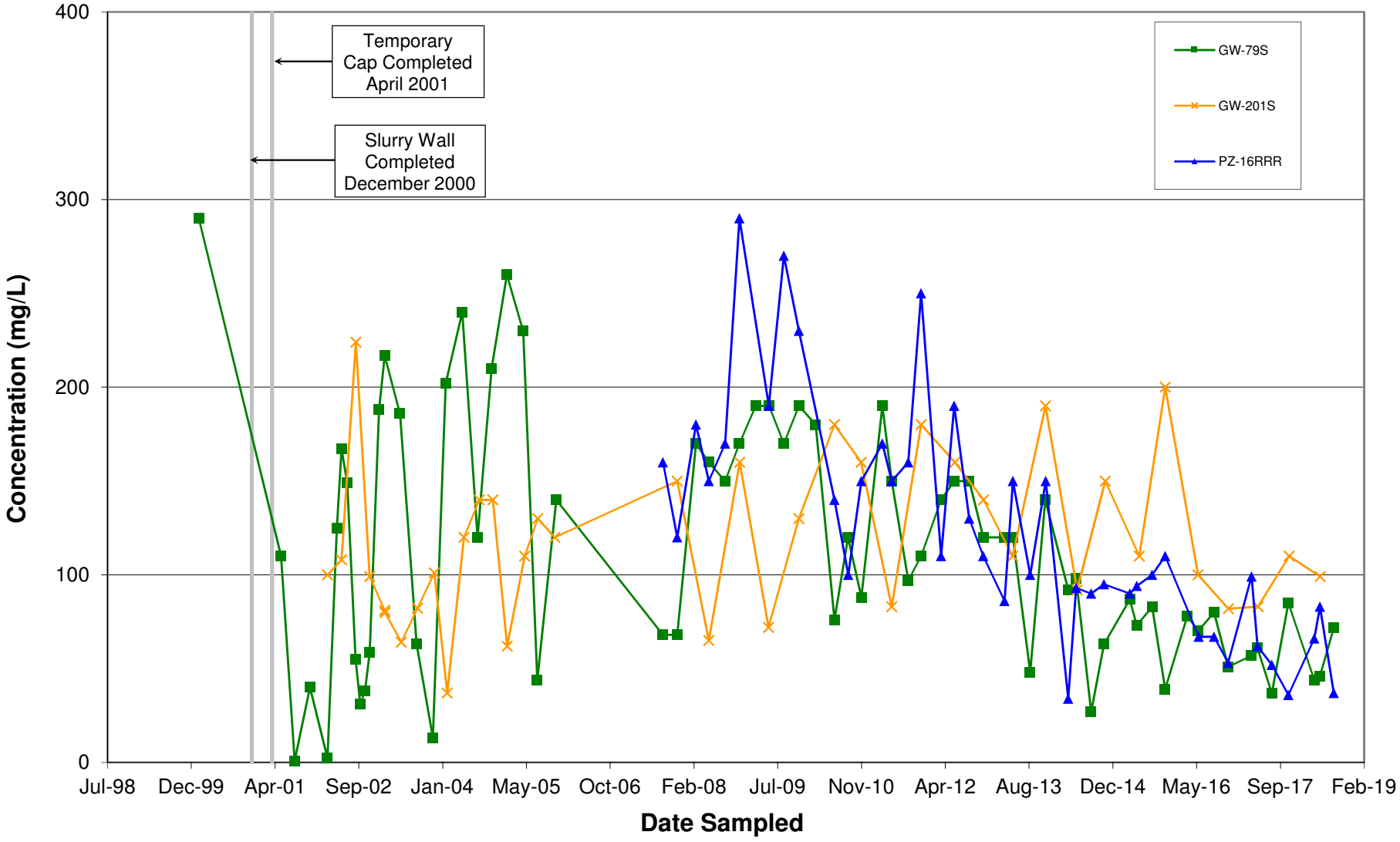
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Ammonia in Groundwater South of Containment Structure Figure D-1.9

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Ammonia GW S

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

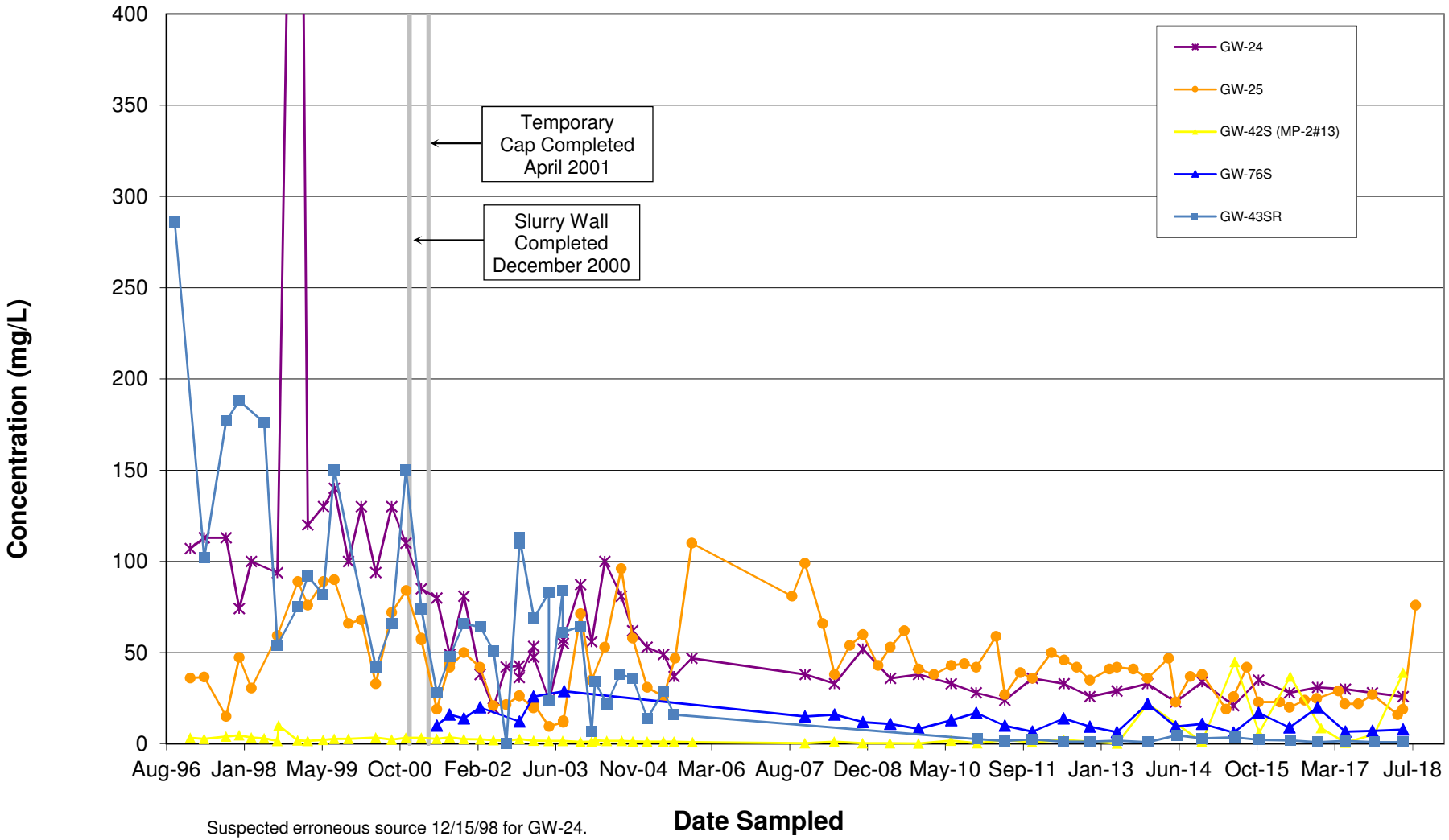
wood.

Ammonia in Groundwater
Southeast of Containment Structure

Figure D-1.10

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Ammonia GW SE

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018

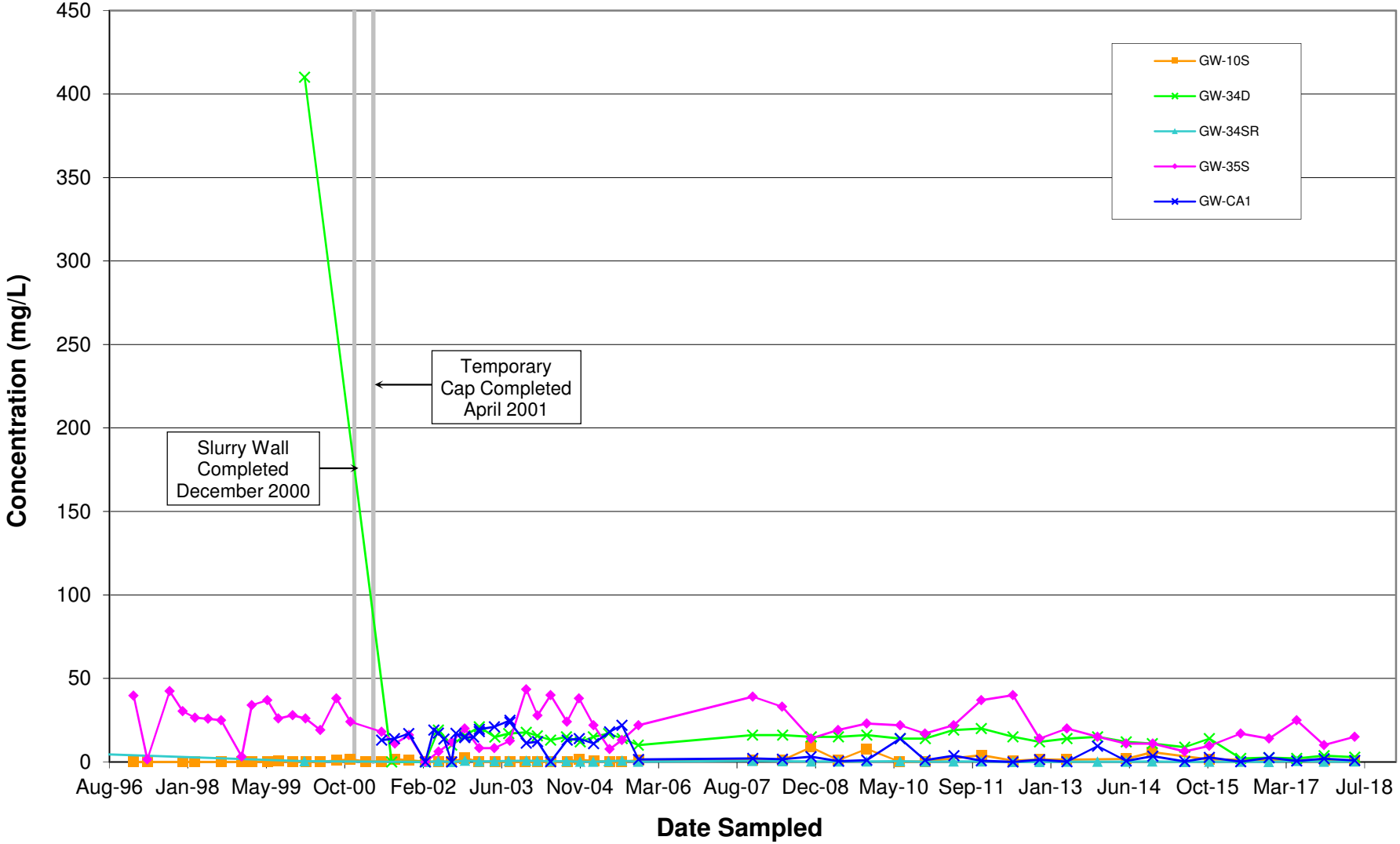


Suspected erroneous source 12/15/98 for GW-24.

Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Ammonia in Groundwater West of Containment Structure Figure D-1.11

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Ammonia GW W

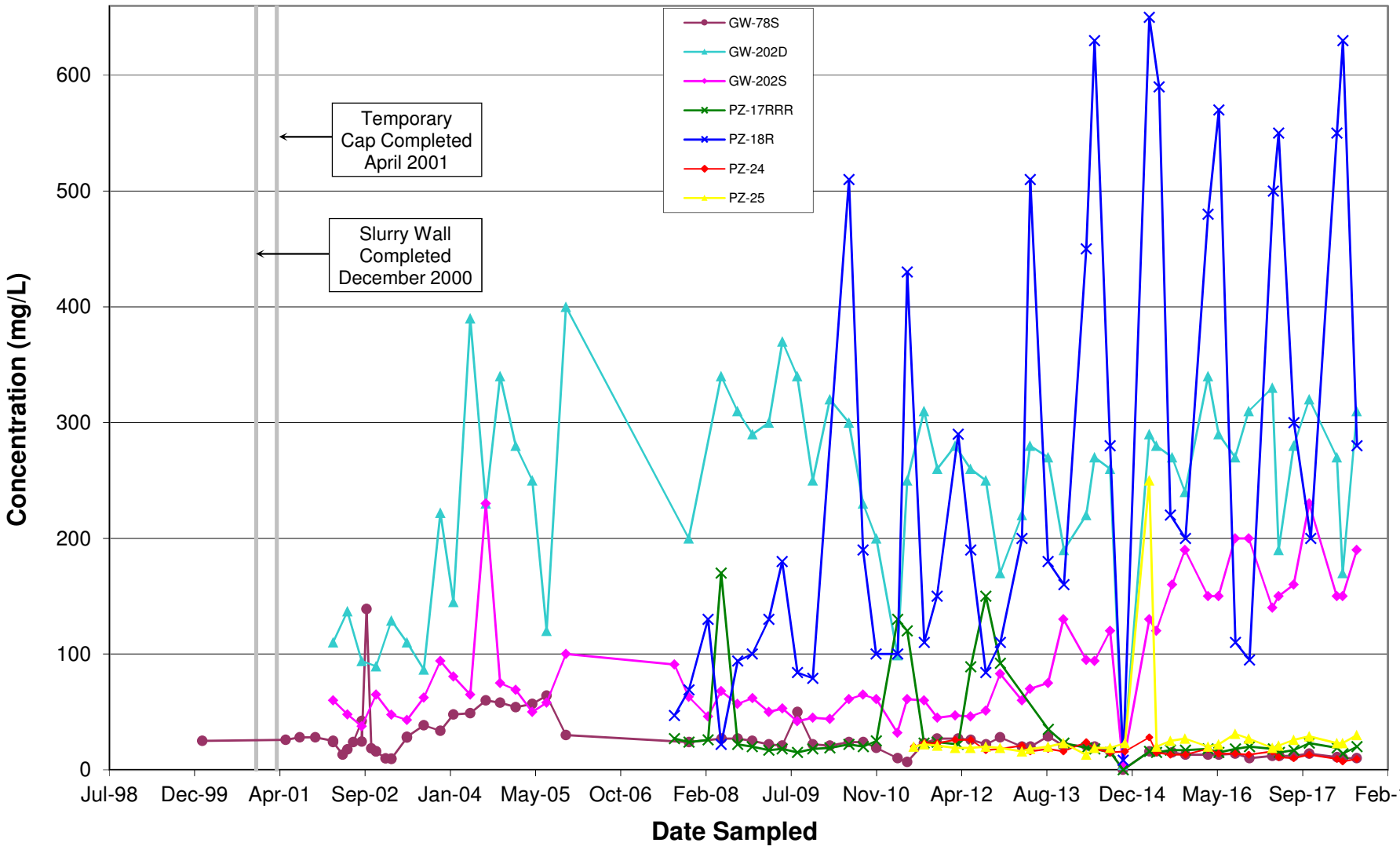
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Ammonia in Groundwater North of Containment Structure Figure D-1.12

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Ammonia GW N

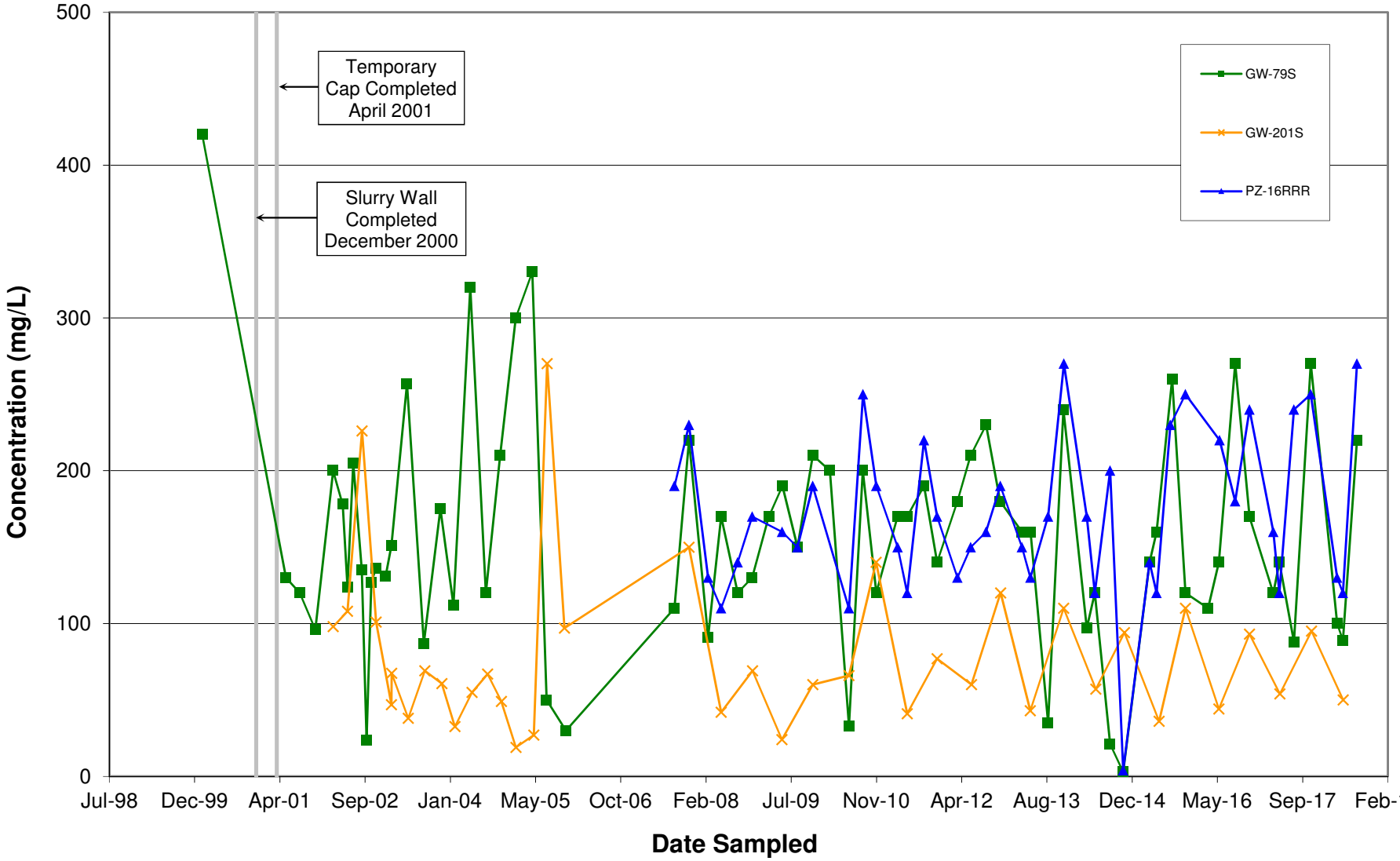
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Chloride in Groundwater South of Containment Structure Figure D-1.13

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Chloride GW S

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

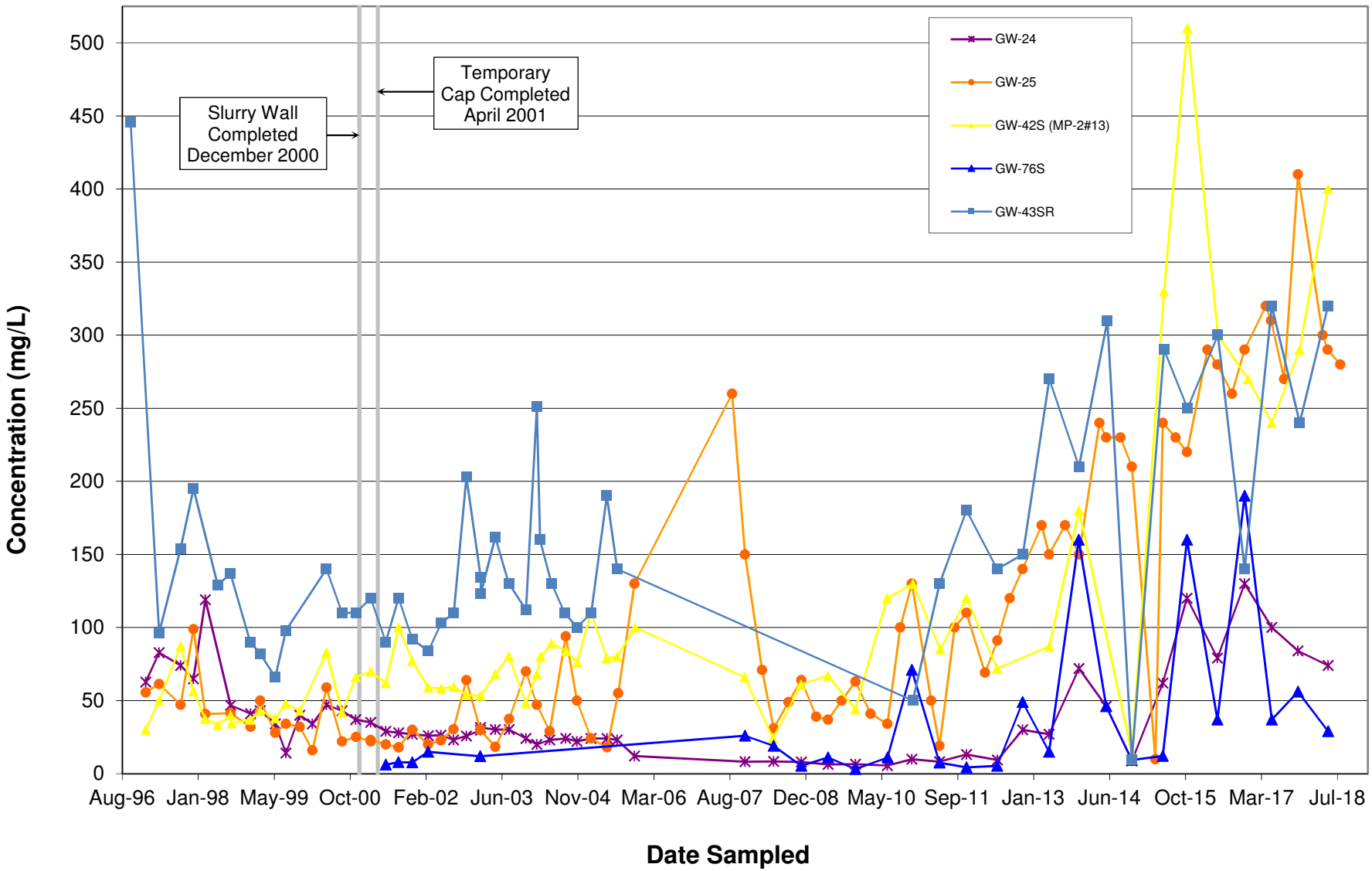
wood.

Chloride in Groundwater
Southeast of Containment Structure

Figure D-1.14

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Chloride GW SE

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

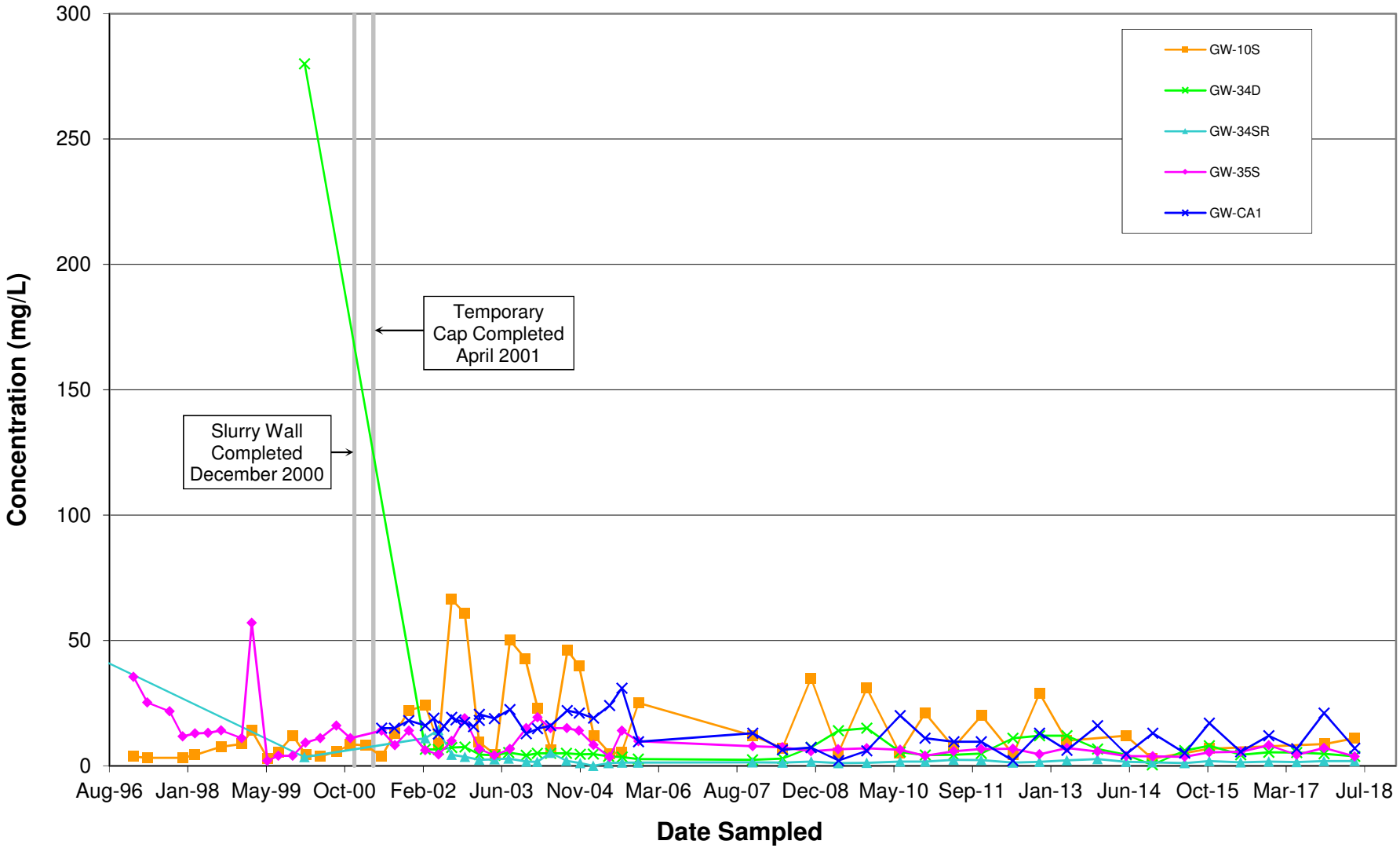
wood.

Chloride in Groundwater
West of Containment Structure

Figure D-1.15

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Chloride GW W

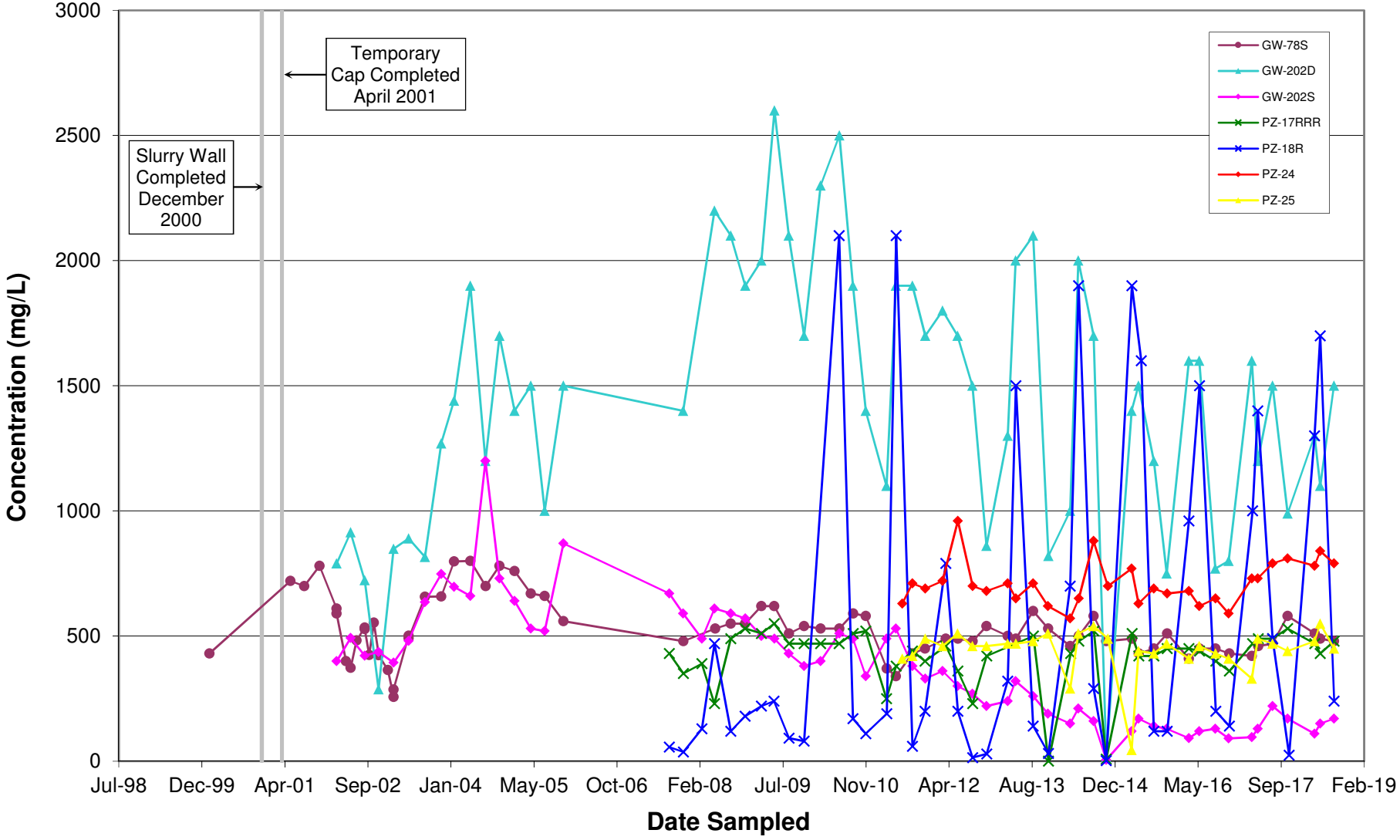
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Chloride in Groundwater North of Containment Structure Figure D-1.16

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Chloride GW N

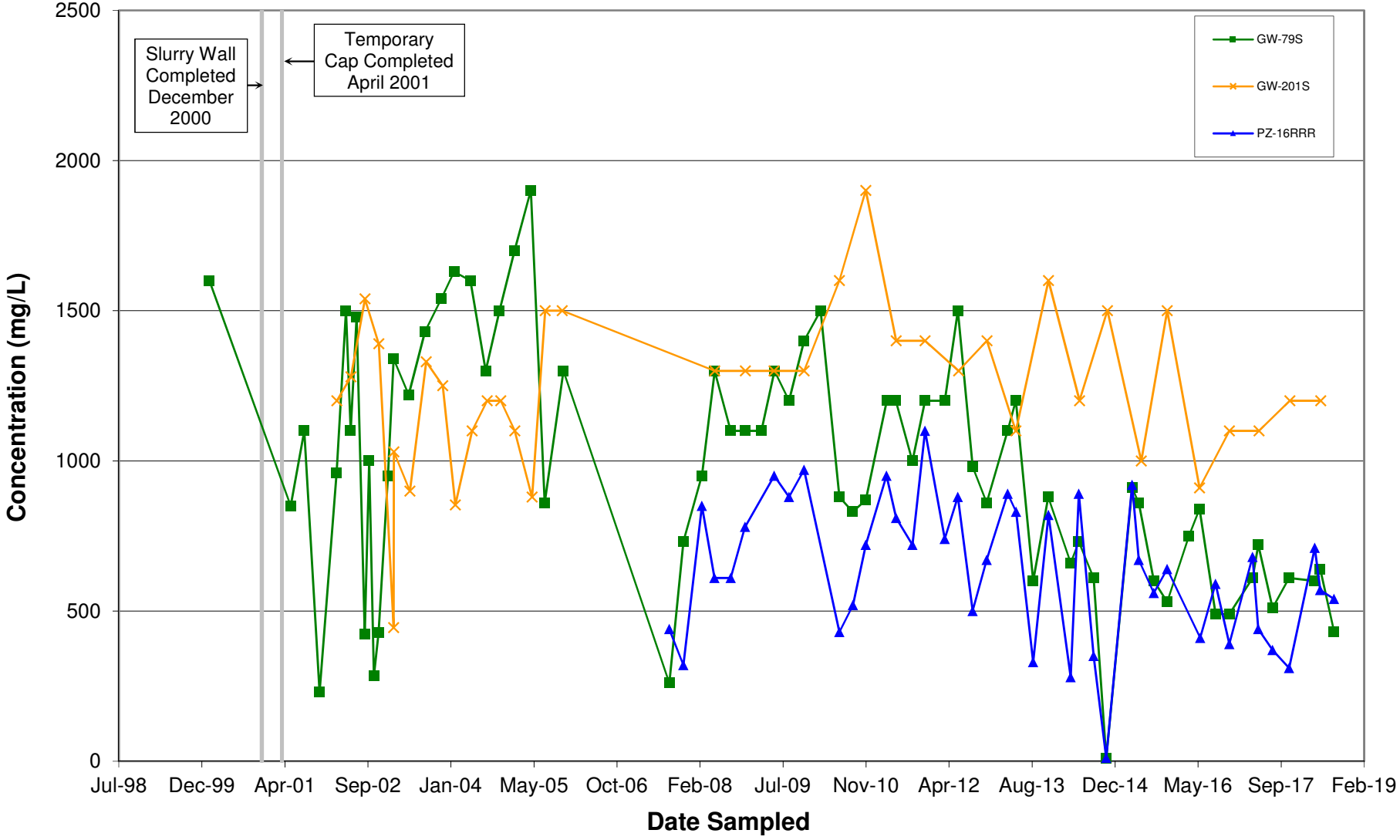
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Sulfate in Groundwater South of Containment Structure Figure D-1.17

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Sulfate GW S

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

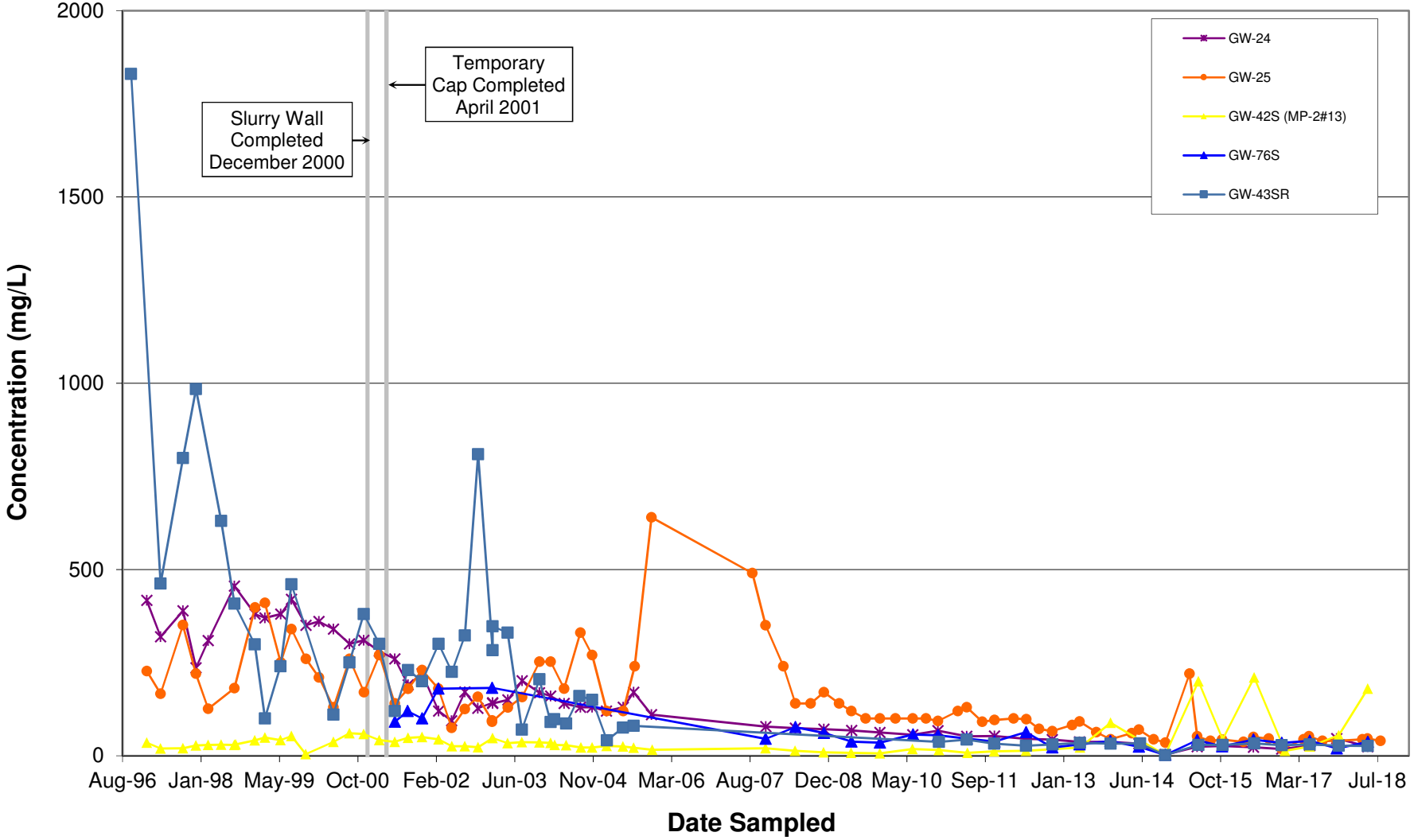
wood.

Sulfate in Groundwater
Southeast of Containment Structure

Figure D-1.18

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Sulfate GW SE

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

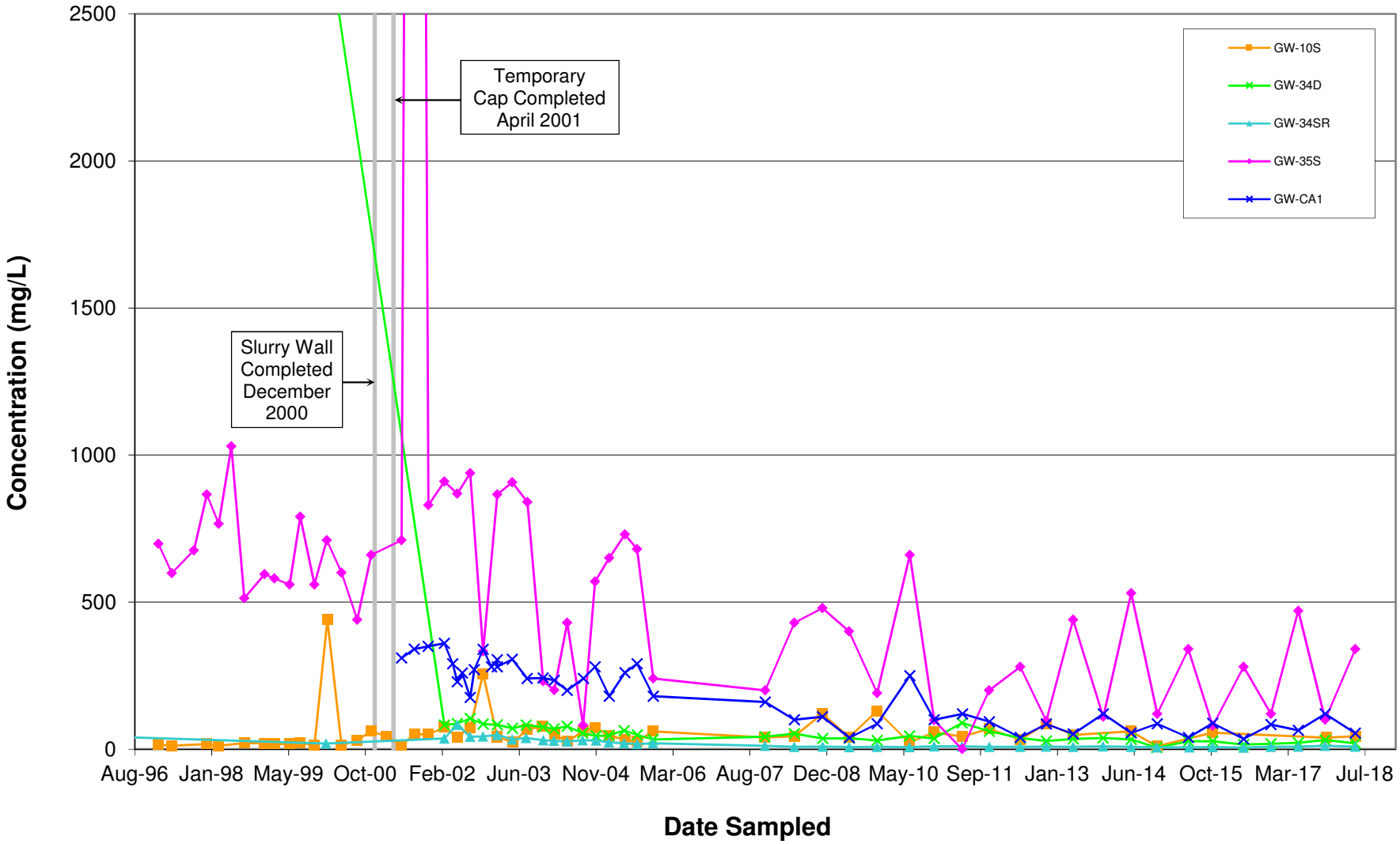
wood.

Sulfate in Groundwater
West of Containment Structure

Figure D-1.19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Sulfate GW W

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

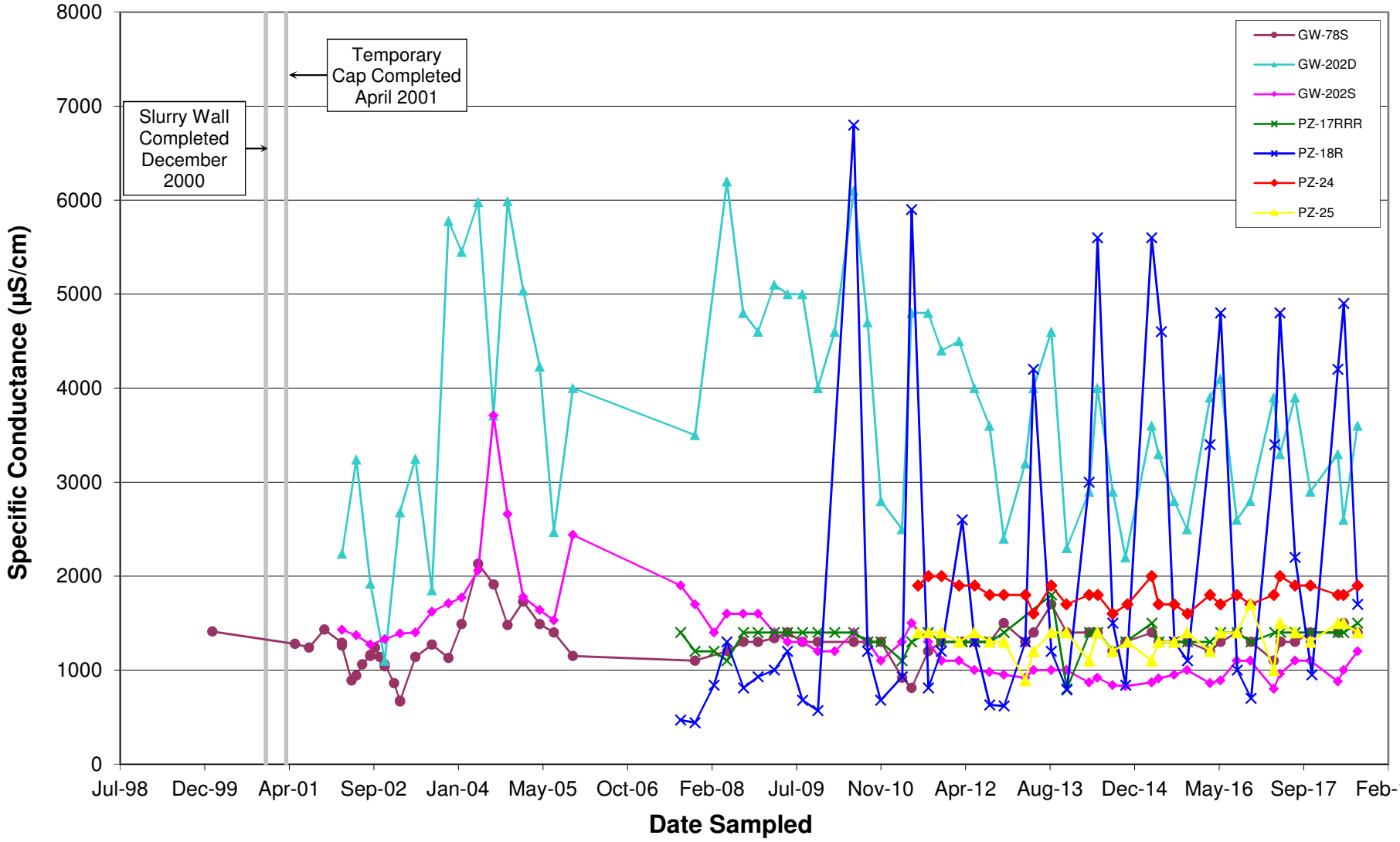
wood.

Sulfate in Groundwater
North of Containment Structure

Figure D-1.20

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Sulfate GW N

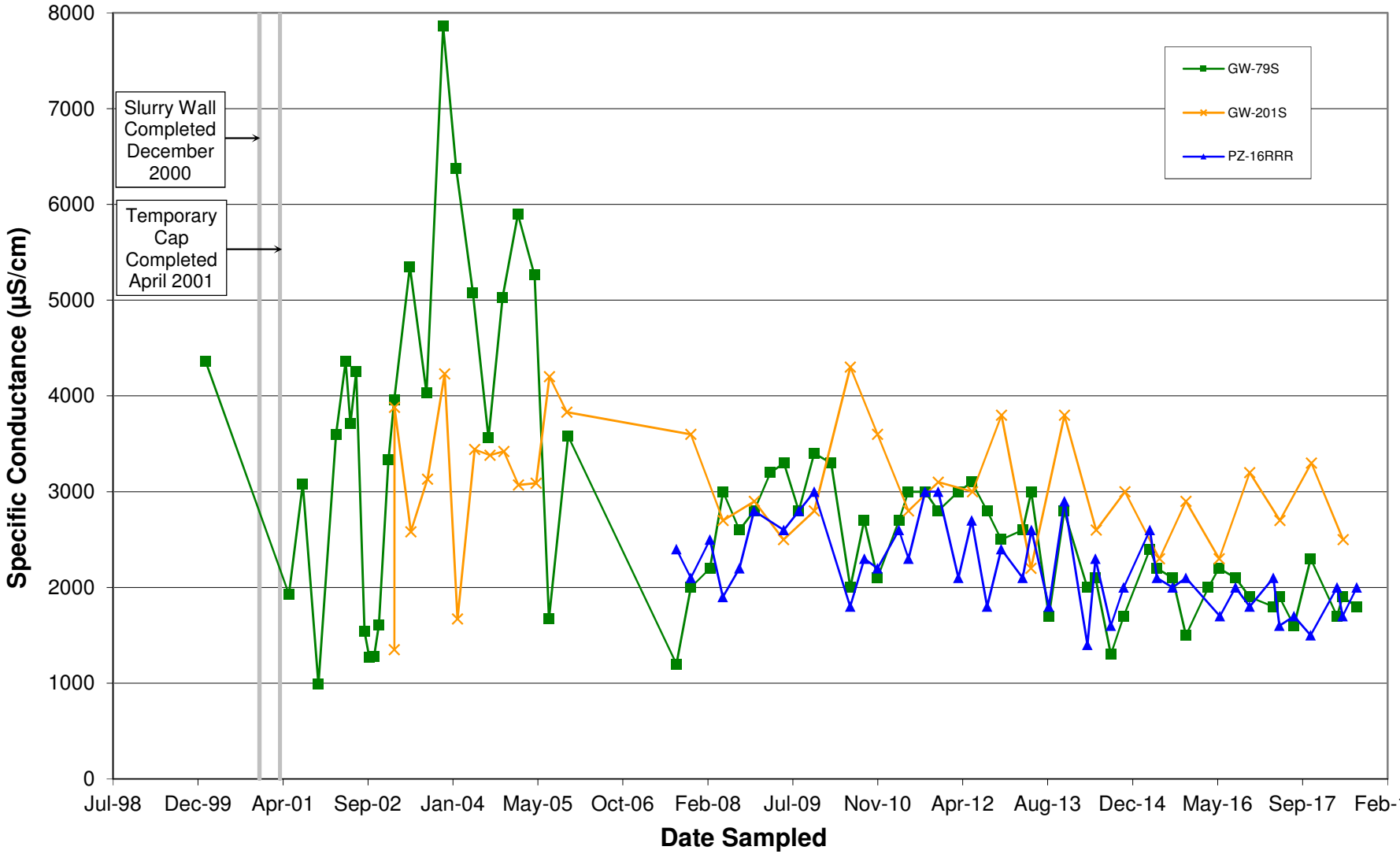
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Specific Conductance in Groundwater South of Containment Structure Figure D-1.21

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance GW S

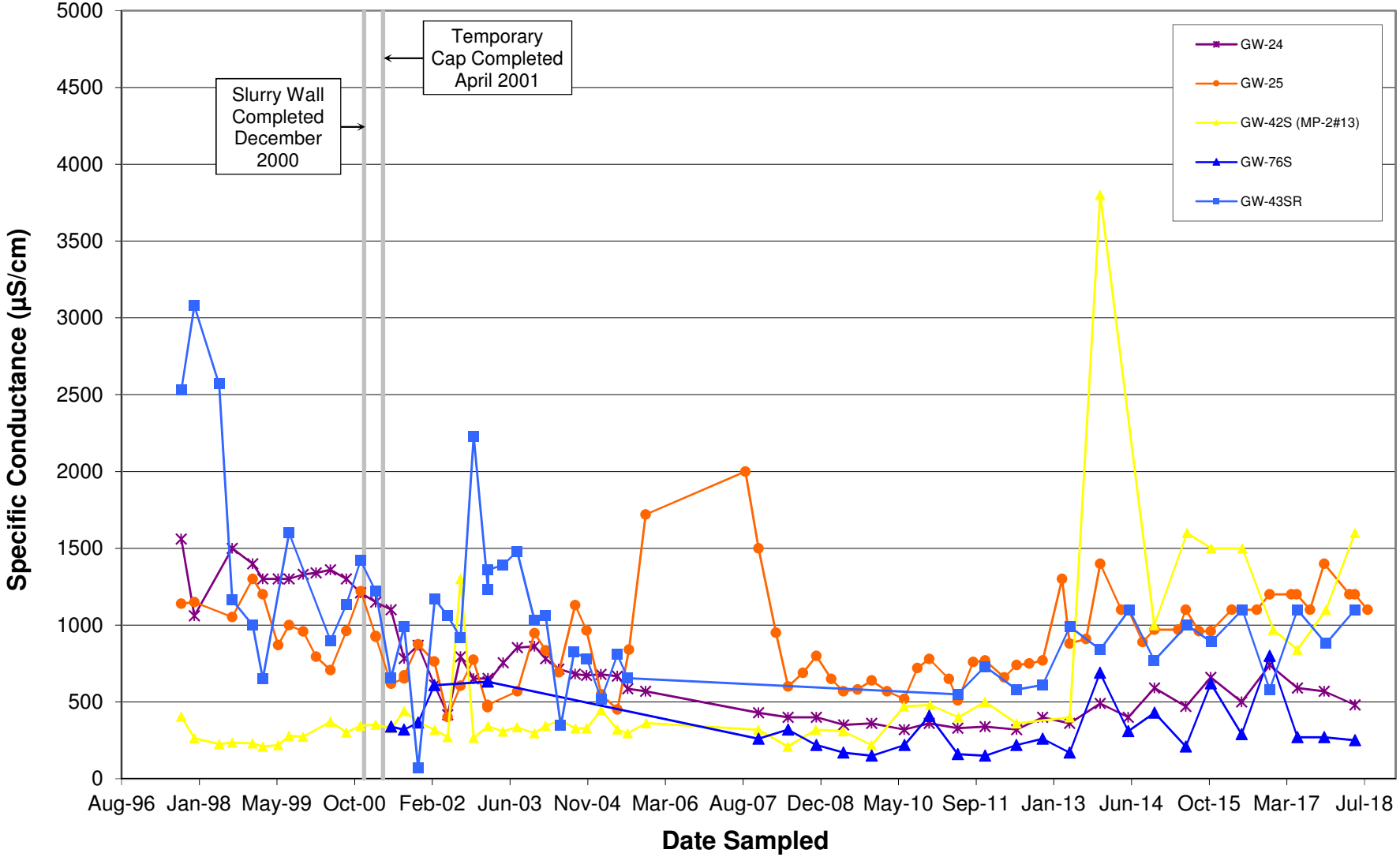
Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Specific Conductance in Groundwater Southeast of Containment Structure Figure D-1.22

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance GW SE

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

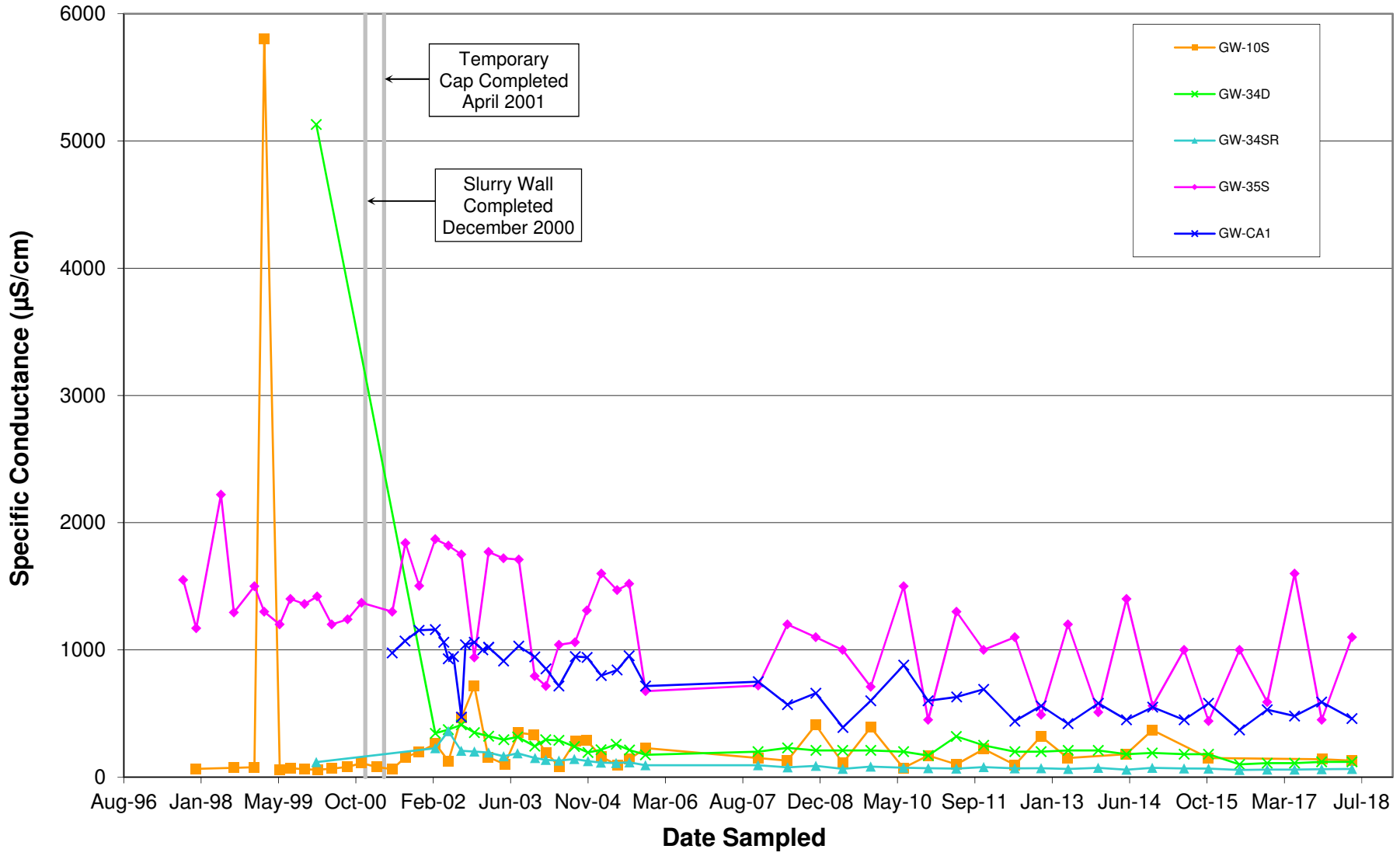
wood.

Specific Conductance in Groundwater
West of Containment Structure

Figure D-1.23

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance GW W

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



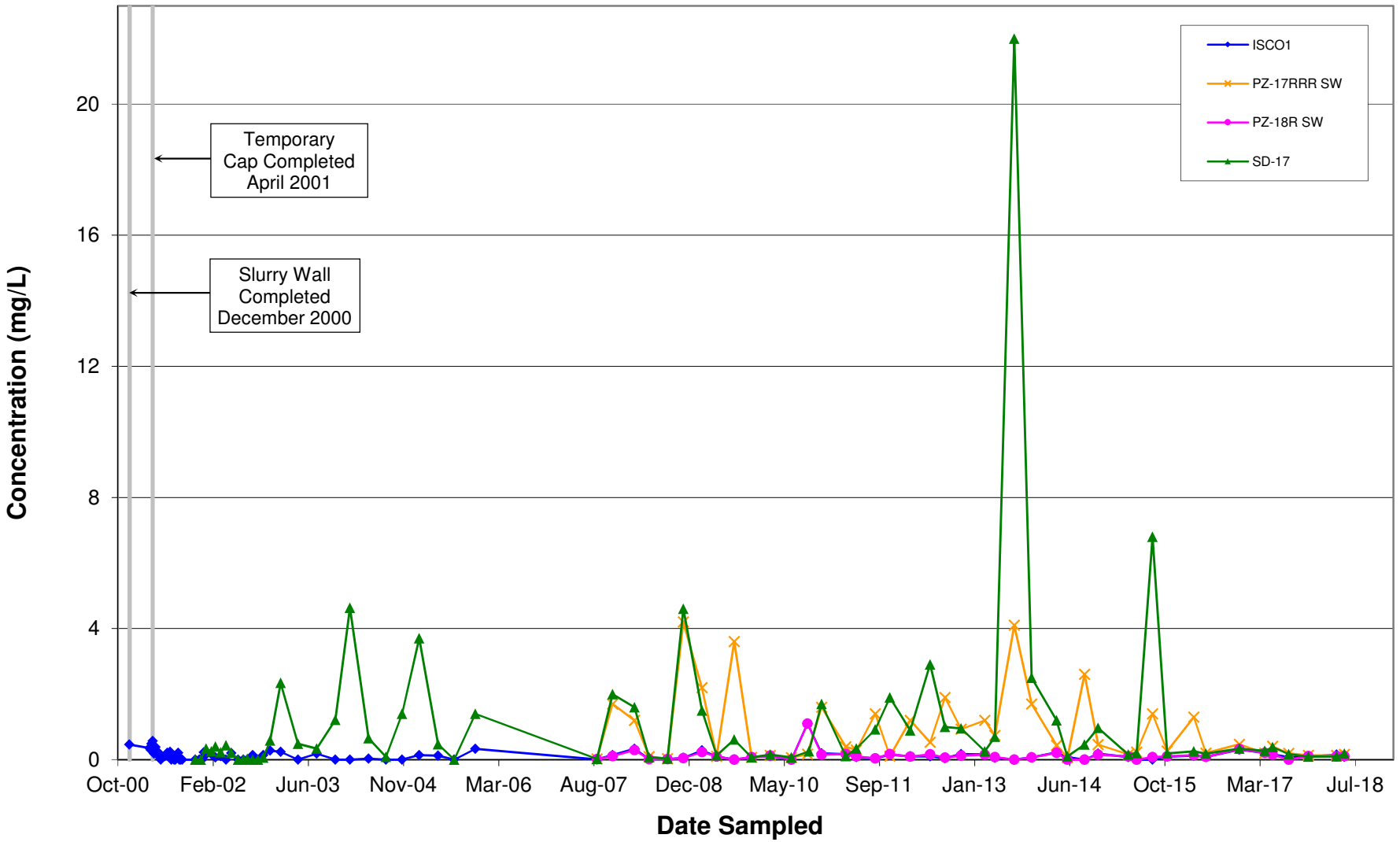
Semi-Annual Status Report No. 23 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Specific Conductance in Groundwater North of Containment Structure Figure D-1.24

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance GW N

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018

Appendix D2

Surface Water
(Aluminum, Ammonia, Chloride, Chromium, Sulfate)



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

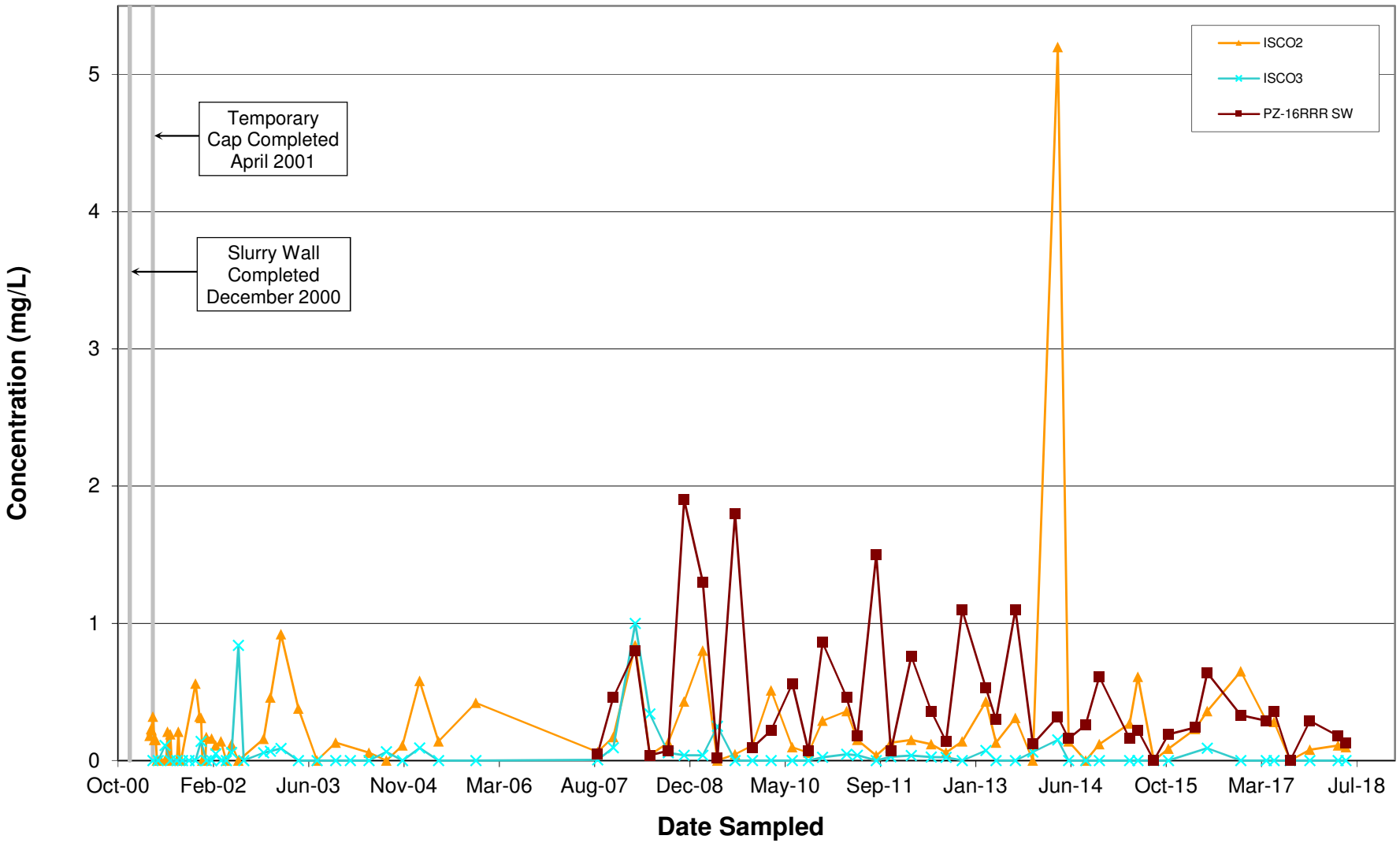
wood.

Filtered Aluminum in Surface Water
in the Upper South Ditch

Figure D-2.1

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Aluminum SW UpperSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

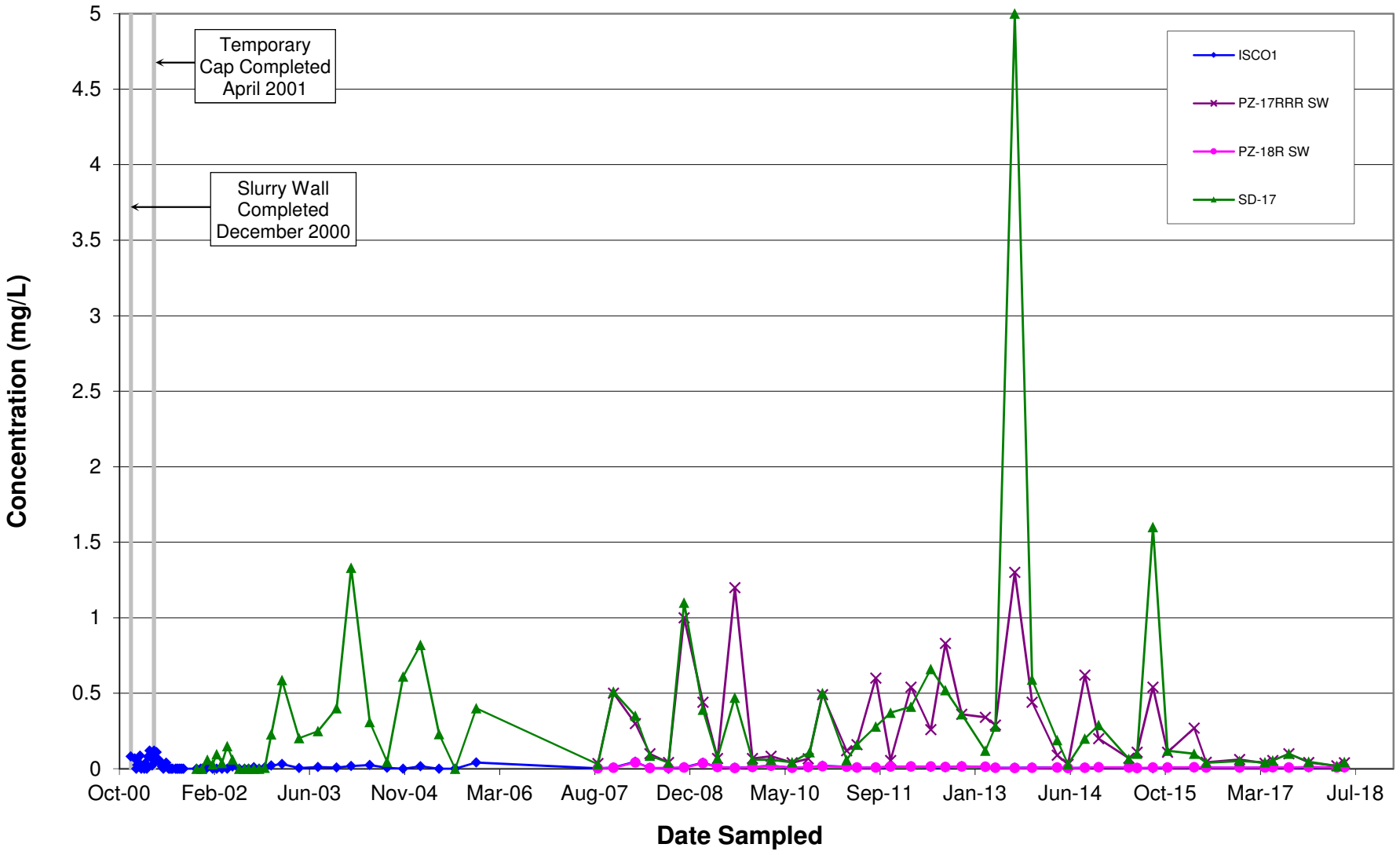
wood.

Filtered Aluminum in Surface Water
in the Lower South Ditch

Figure D-2.2

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Aluminum SW LowerSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

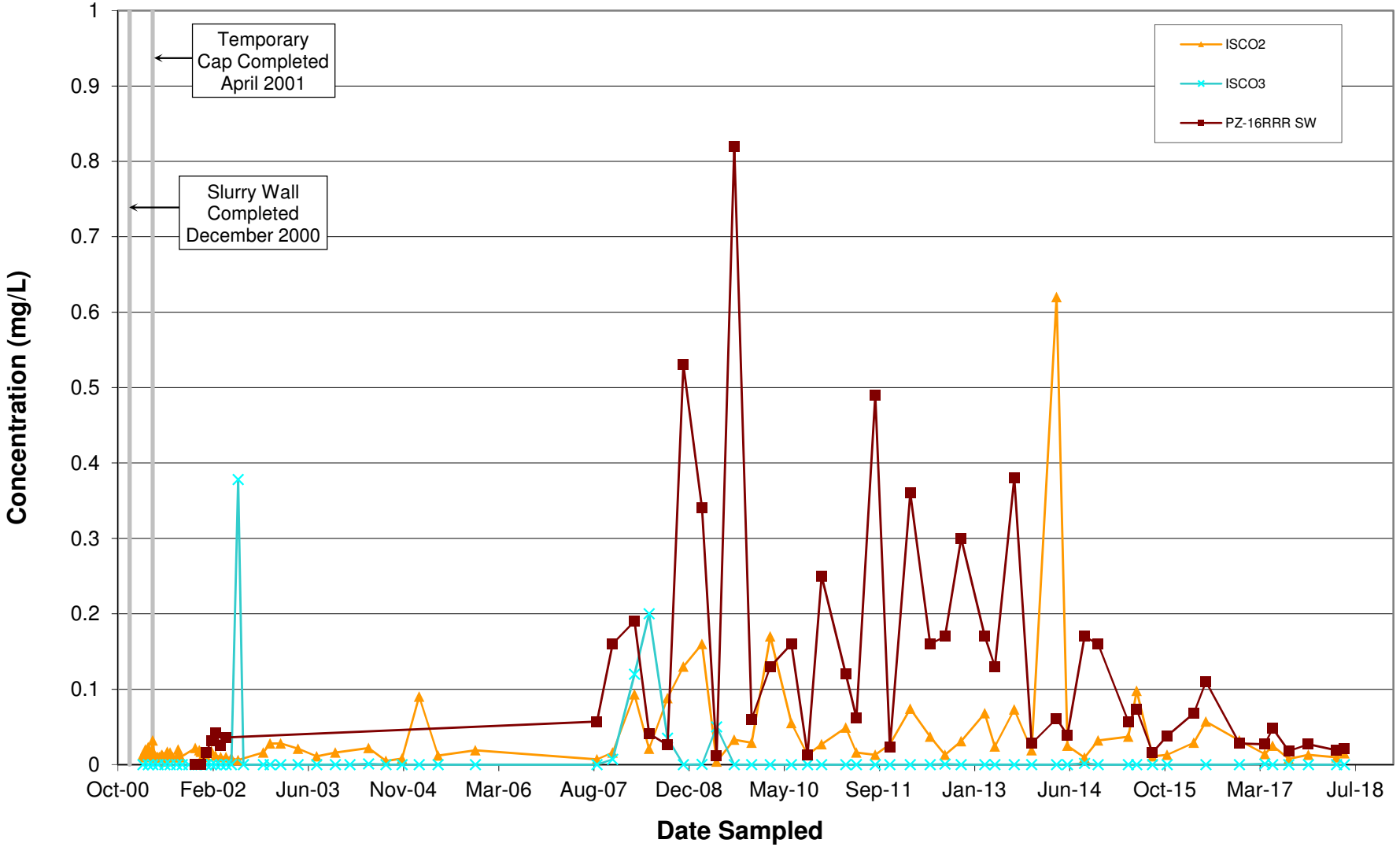
wood.

Filtered Chromium in Surface Water
in the Upper South Ditch

Figure D-2.3

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium SW UpperSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

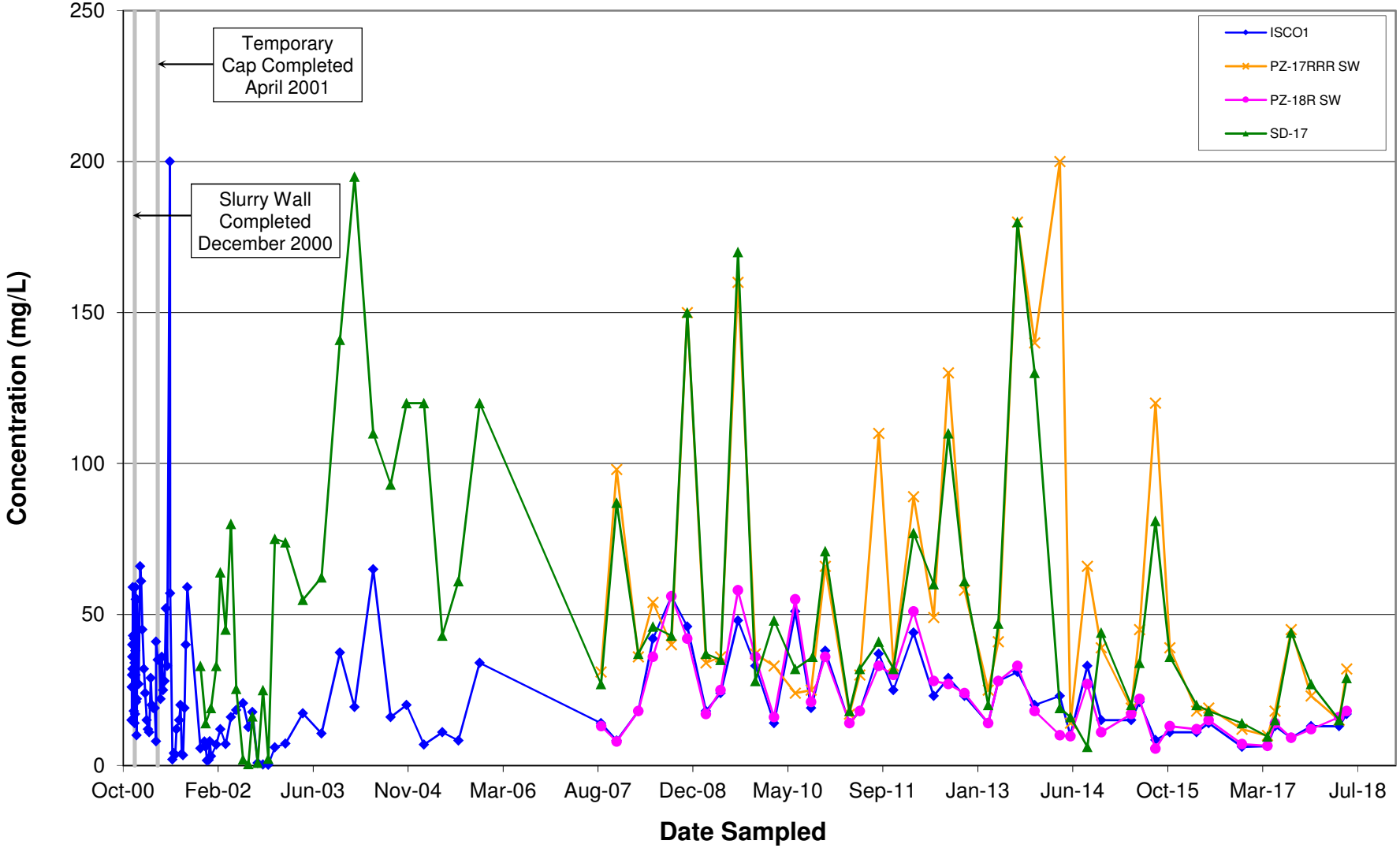
wood.

Filtered Chromium in Surface Water
in the Lower South Ditch

Figure D-2.4

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium SW LowerSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

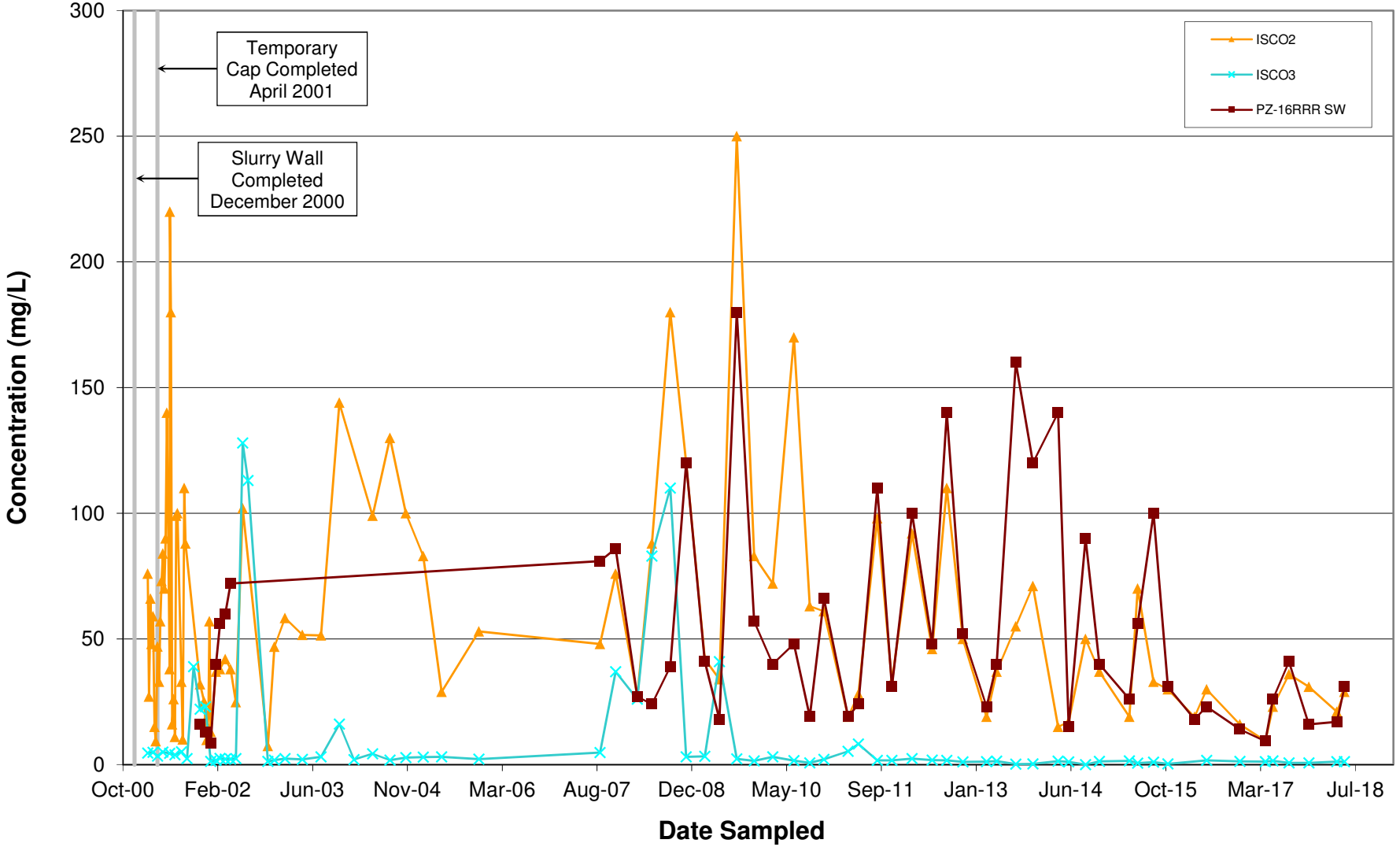
wood.

Ammonia in Surface Water
in the Upper South Ditch

Figure D-2.5

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Ammonia SW UpperSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

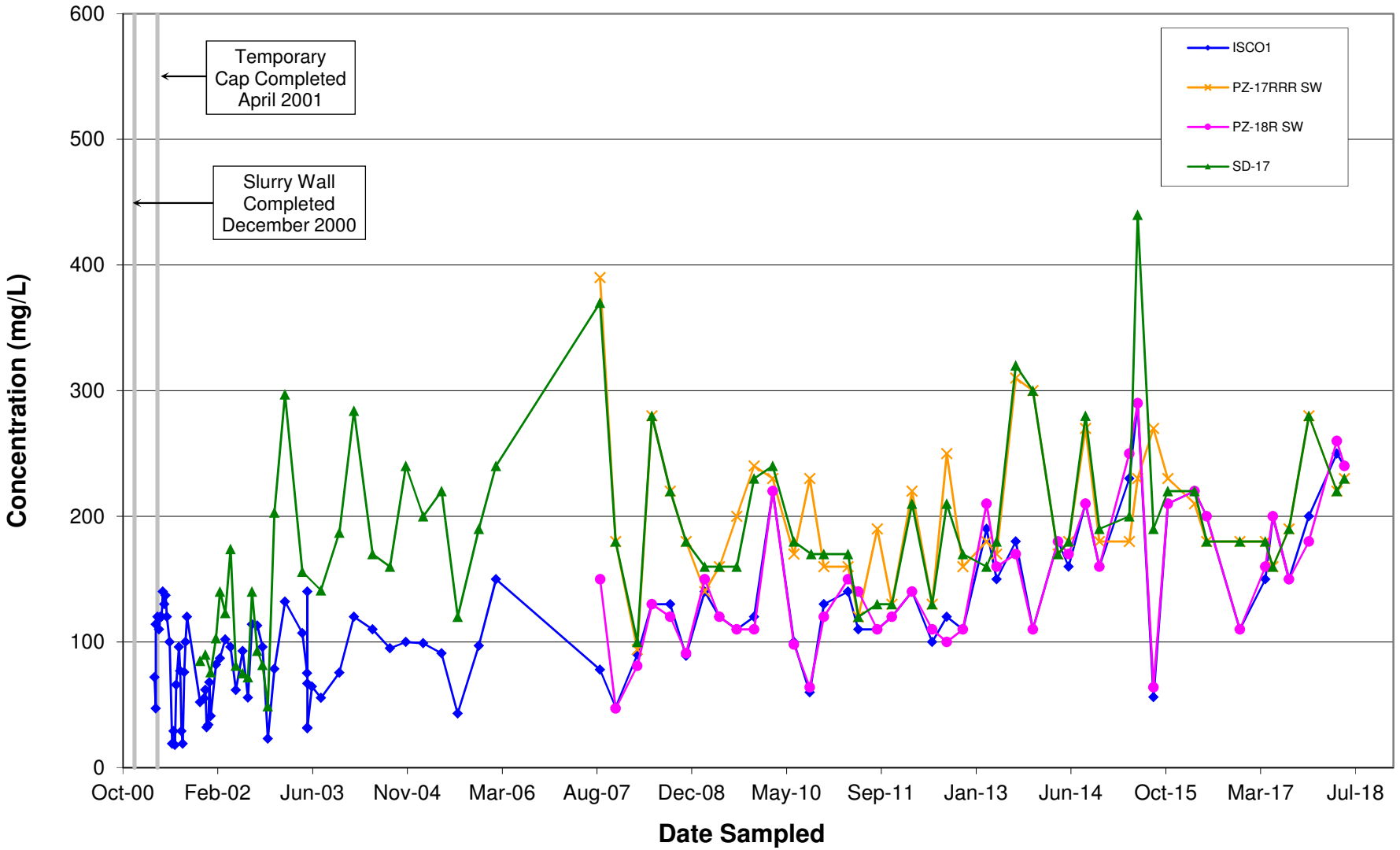
wood.

Ammonia in Surface Water
in the Lower South Ditch

Figure D-2.6

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Ammonia SW LowerSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
Wilmington, Massachusetts

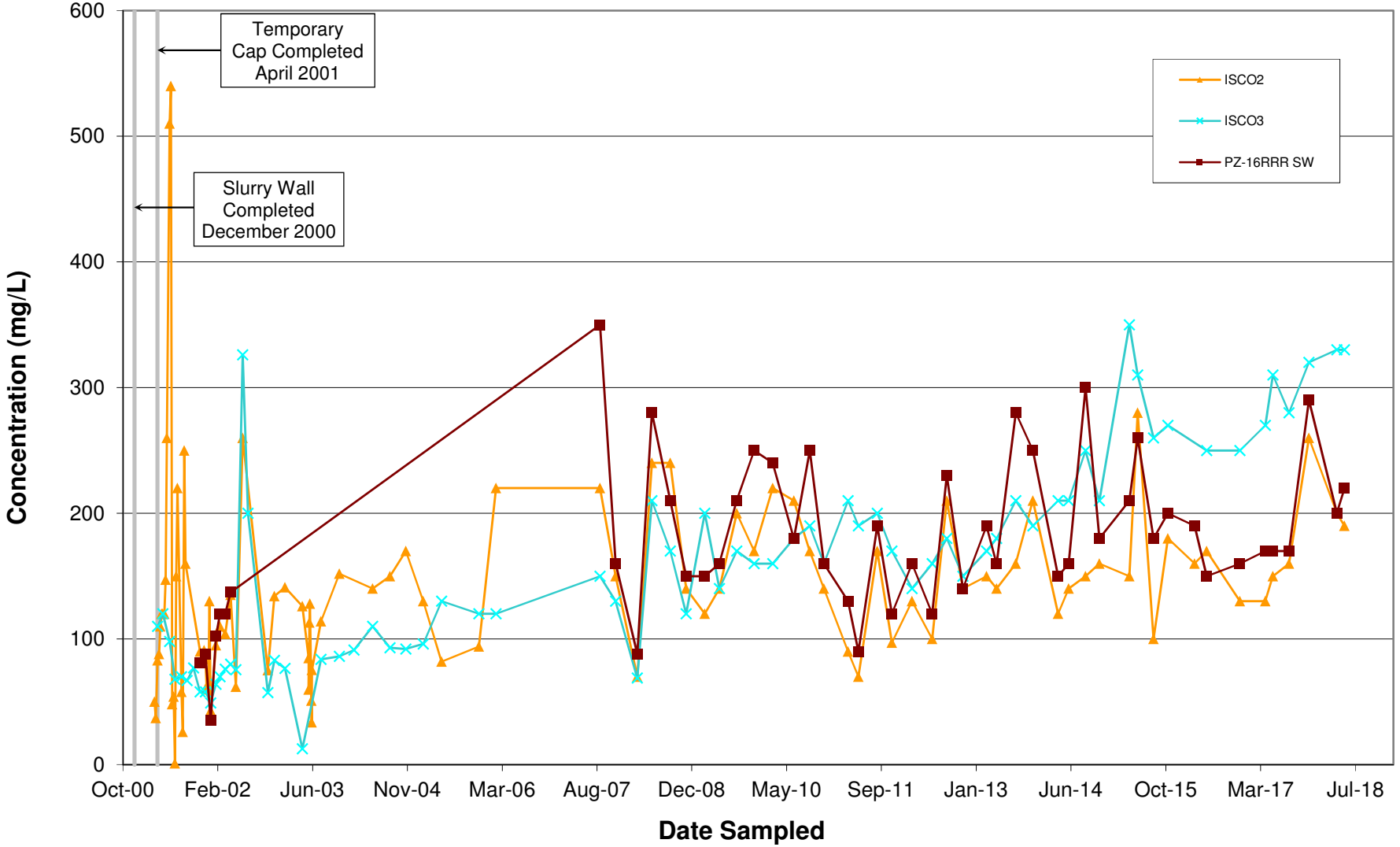
wood.

Chloride in Surface Water
in the Upper South Ditch

Figure D-2.7

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Chloride SW UpperSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



Semi-Annual Status Report No. 23
Olin Chemical Superfund Site
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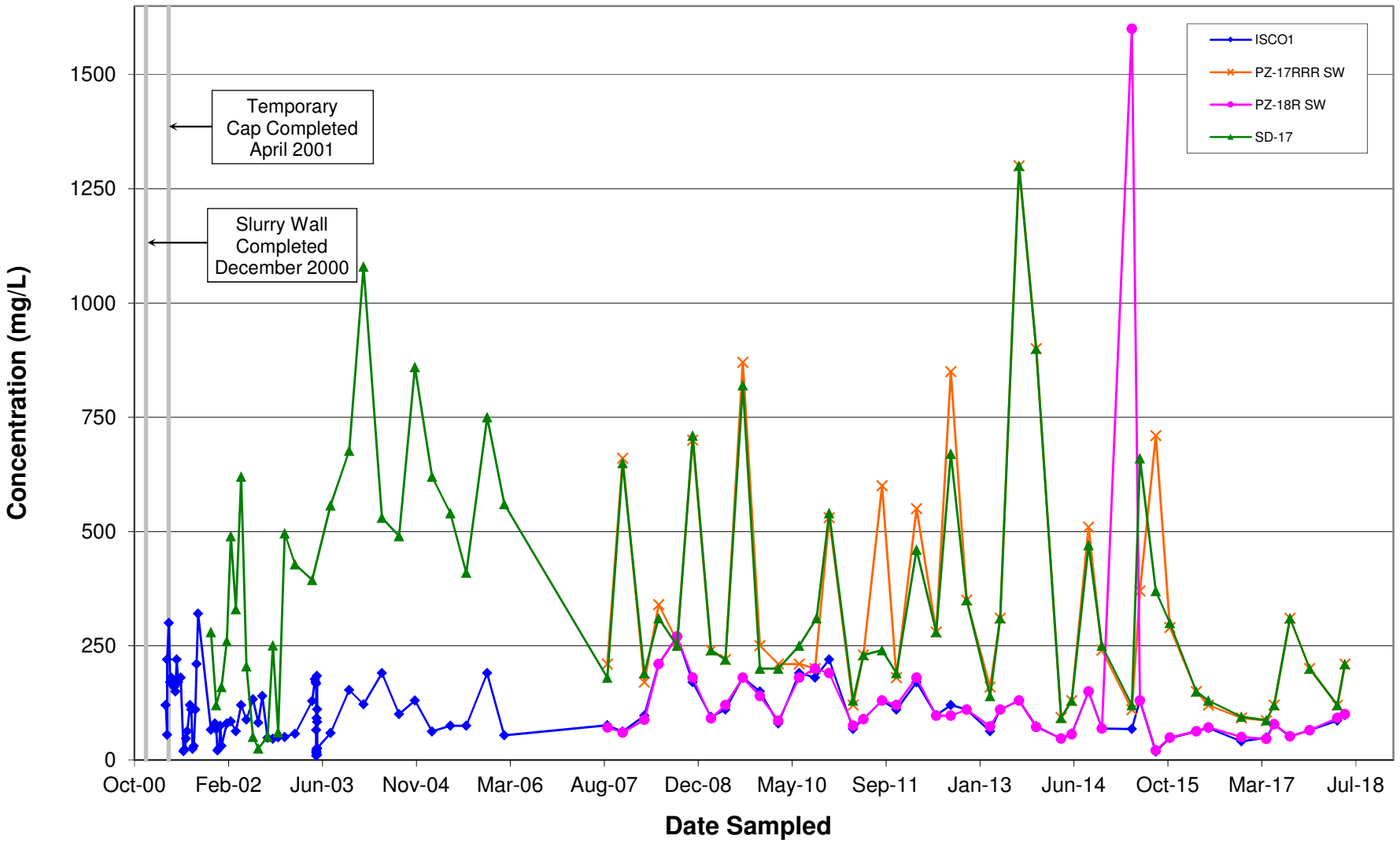
wood.

Chloride in Surface Water
in the Lower South Ditch

Figure D-2.8

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\Appendix D\
GW_SW Time Series Plots DAPL constituents.xls, Chloride SW LowerSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



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Sulfate in Surface Water
in the Upper South Ditch

Figure D-2.9

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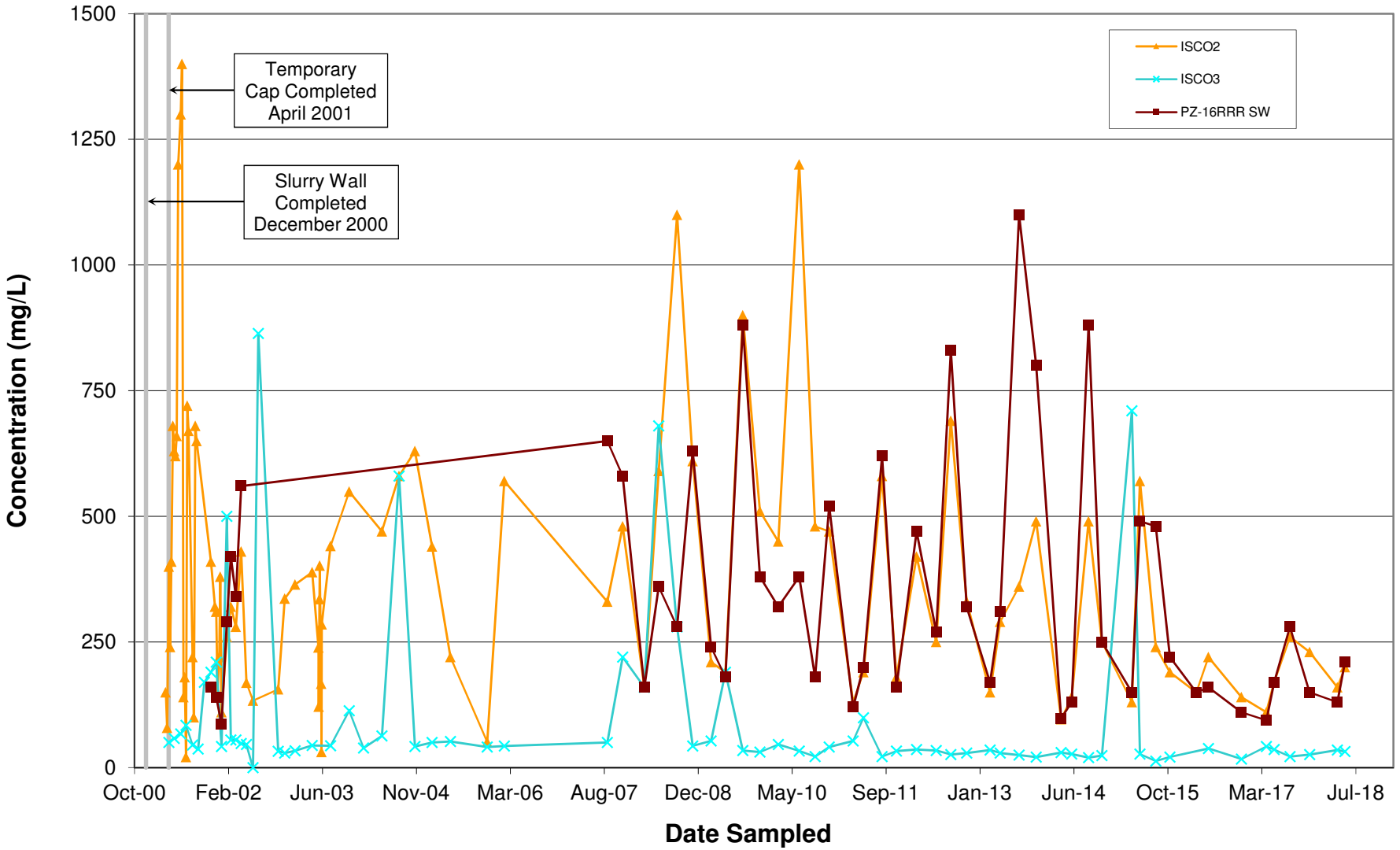
GW_SW Time Series Plots DAPL constituents.xls, Sulfate SW UpperSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



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Sulfate in Surface Water
in the Lower South Ditch

Figure D-2.10

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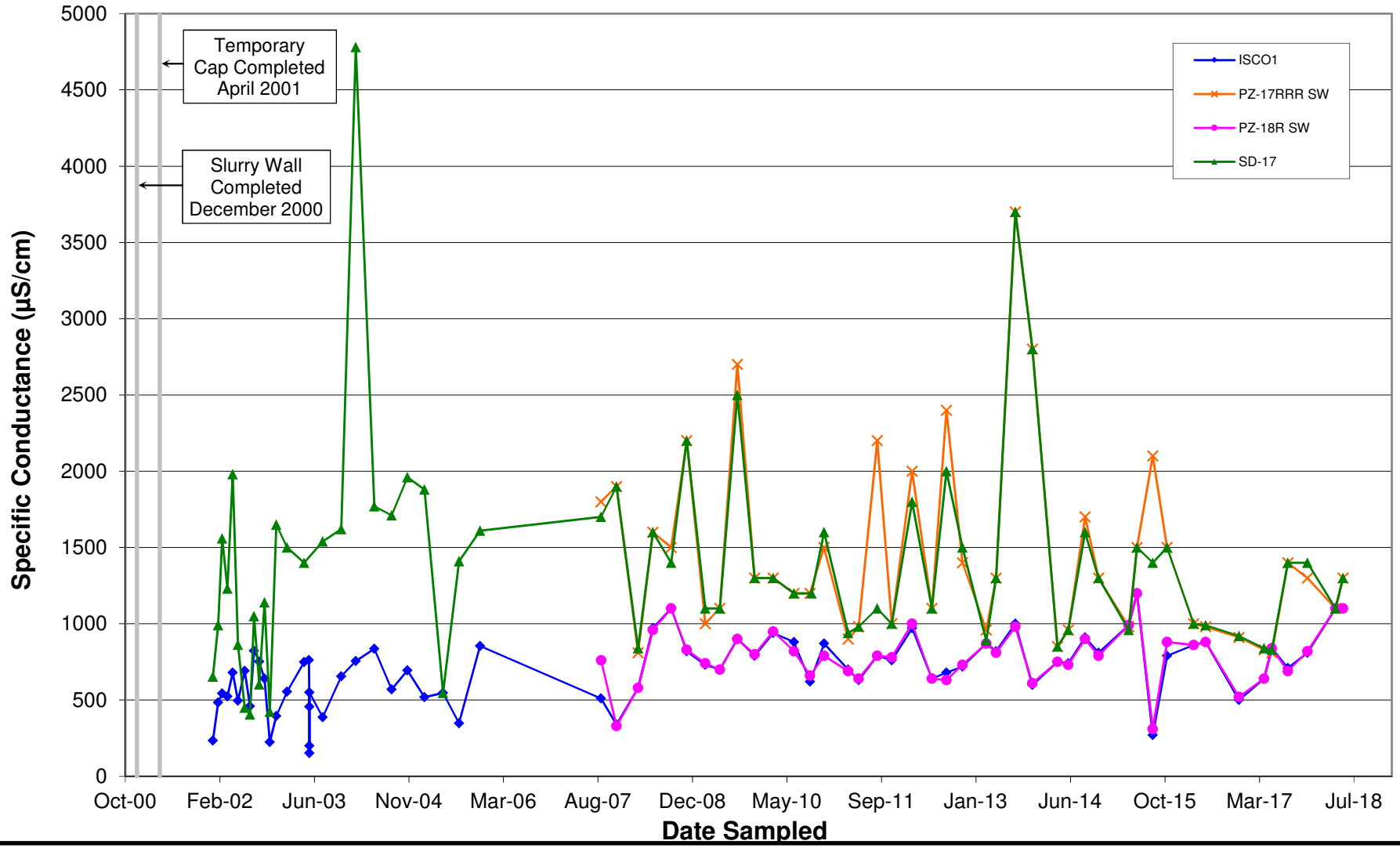
GW_SW Time Series Plots DAPL constituents.xls, Sulfate SW LowerSD

Prepared by: CTM 11/2/2018
Checked by: SAI 11/2/2018



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wood.

Specific Conductance in Surface Water in the Upper South Ditch

Figure D-2.11

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GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance SW UpperSD

Prepared by: CTM 11/2/2018
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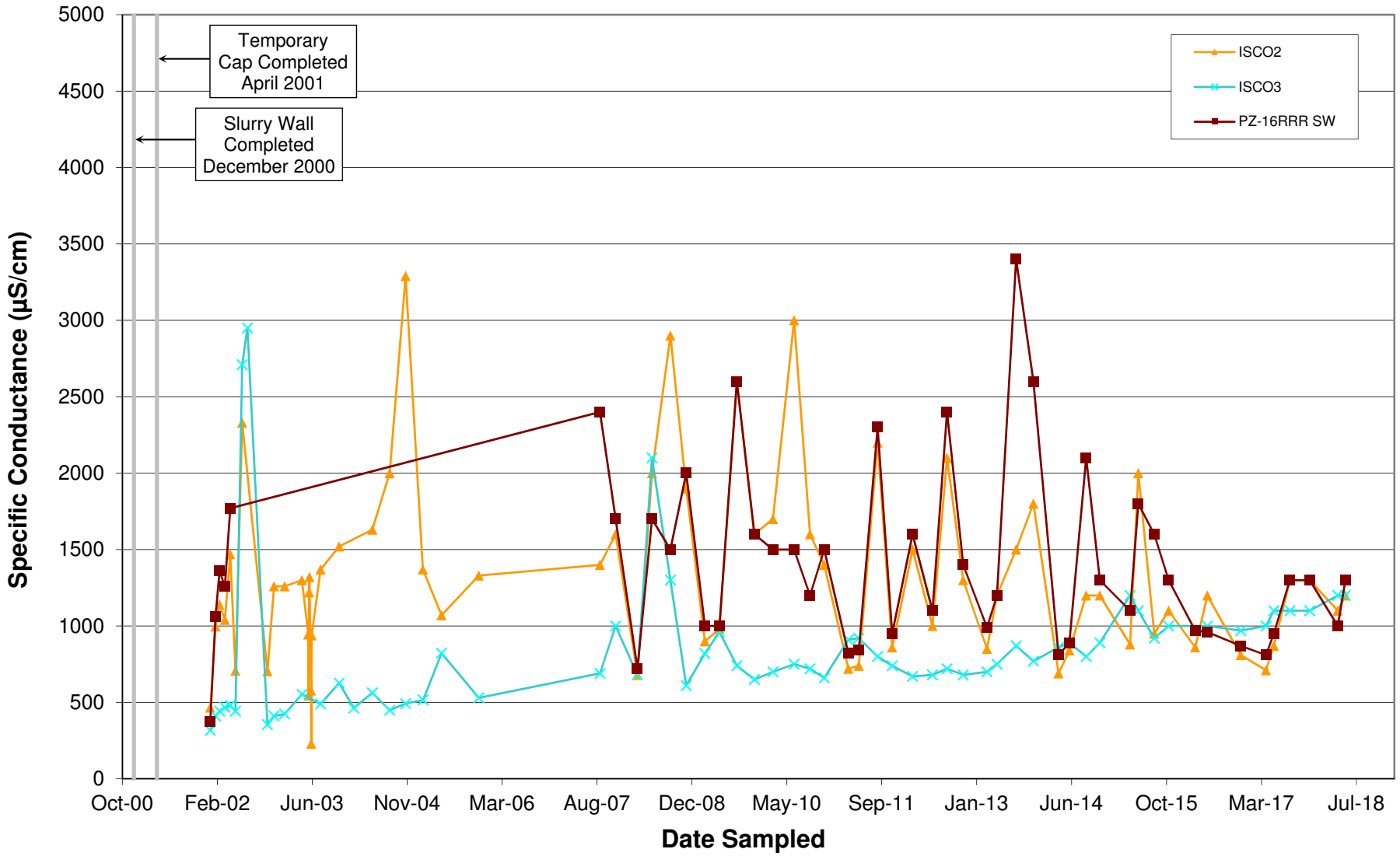

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wood.

Specific Conductance in Surface Water in the Lower South Ditch

Figure D-2.12

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GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance SW LowerSD

Prepared by: CTM 11/2/2018
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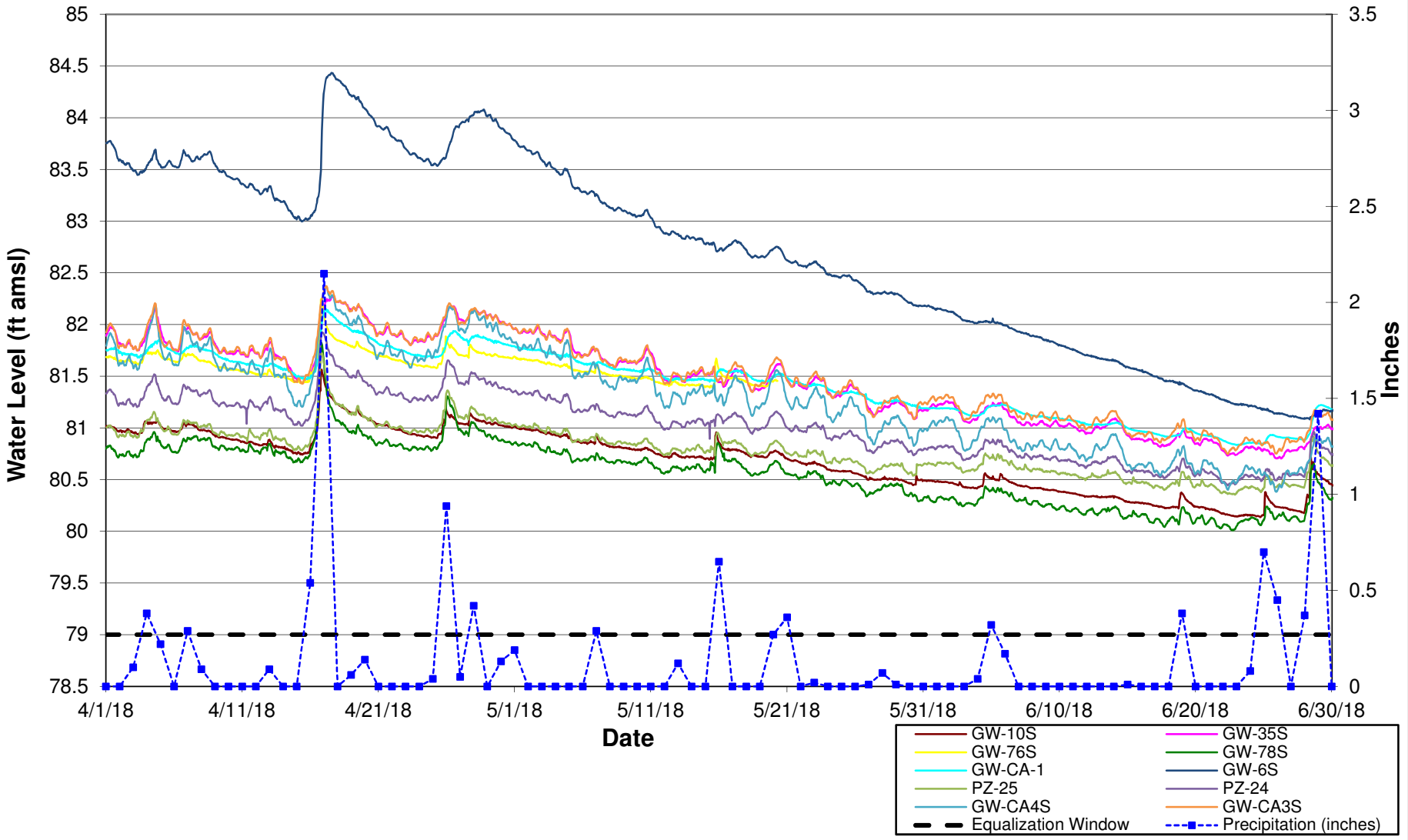
Appendix E

Slurry Wall/Cap Data Logger Water Level Plots



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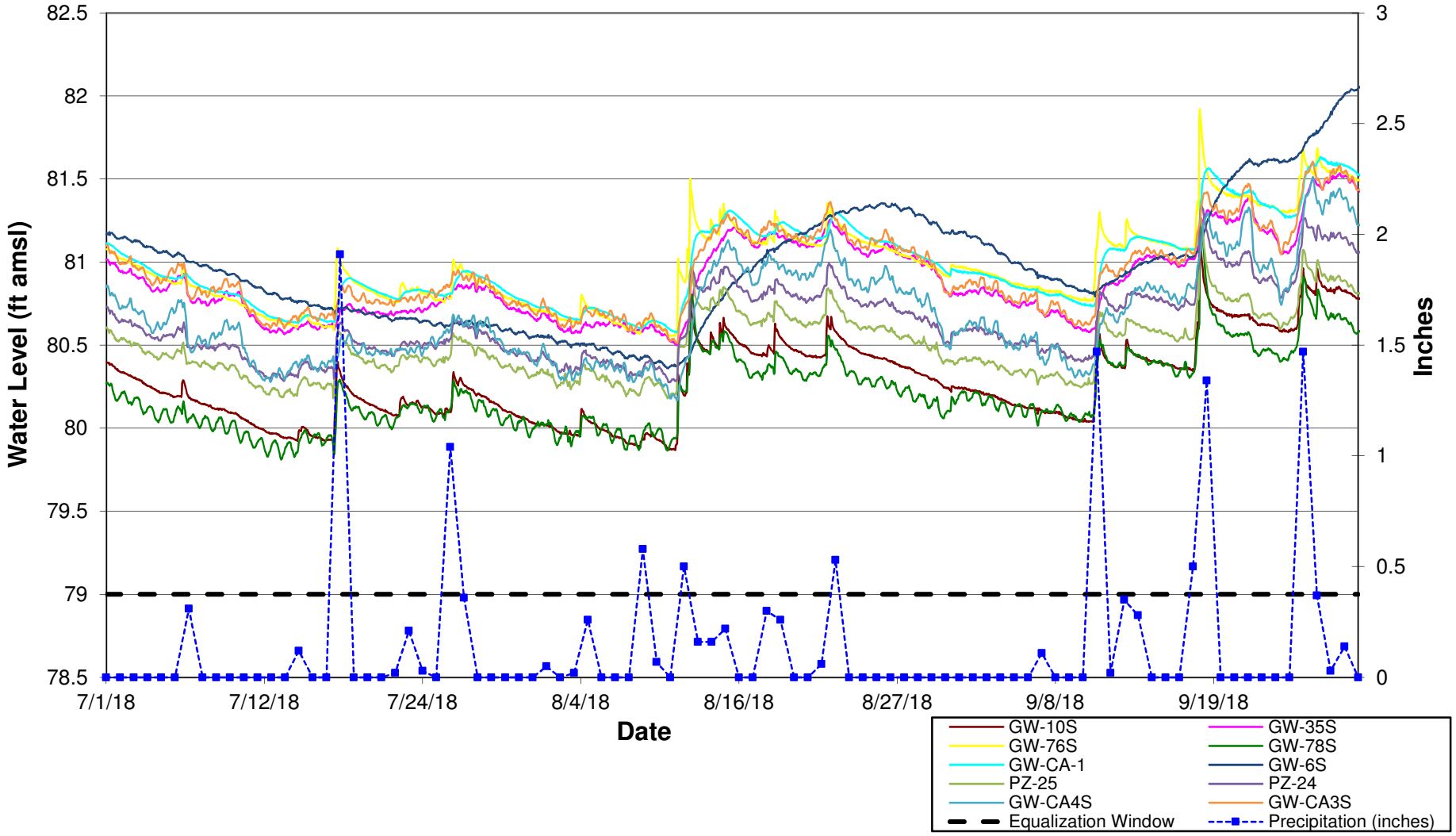
Olin Wilmington Superfund Site
Wilmington, Massachusetts

wood.

Groundwater Elevation (Corrected for Barometric Pressure) and Precipitation
Second Quarter 2018
Figure E-1

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\
Olin Data Logger Corrections_SASR 23 QTR 2 3.xls2nd Quarter 2018 Fig

Prepared by: JKR 10/26/2018
Checked by: CTM 10/26/2018



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wood.

Groundwater Elevation (Corrected for Barometric Pressure) and Precipitation
Third Quarter 2018
Figure E-2

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 January\
Olin Data Logger Corrections_SASR 23 QTR 2 3.xls3rd Quarter 2018 Fig

Prepared by: JKR 10/26/2018
Checked by: CTM 10/26/2018